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PERU is a country in South America, situated between 3° 30′ and 21° 28′ S. lat., and between 65° and 81° 20′ W. long. On the west it is washed by the Pacific; and on the south and south-east it borders on Bolivia. The boundary-line between these states, at the most southern point of Peru, is formed by the small river Loa (21° 28′ S. lat.): it follows the course of this river for several miles, when it turns eastward till it reaches the western edge of the Andes. It follows this edge northward to the mountain-pass of Gualillas (17° 50′ S. lat.), whence it runs northward across the plain of the lake of Titicaca to the southern extremity of that lake. It traverses the lake in a northern direction, which it preserves till it reaches the eastern chain of the Bolivian Andes, near 15° S. lat. It follows this chain for some distance, and then runs along the lateral range which branches off in an east-north-east direction between the river Tuche, an affluent of the Beni, and some rivers which are supposed to fall into the Purus. From the mouth of the river Tuche, the boundary-line between Peru and Bolivia runs along the Rio Beni to its junction with the Guaporé, by which the river Madera is formed. At this point commences the boundary-line between Peru and Brazil. This line follows the Madera river to 9° 30′ S. lat.: it stretches westward along this parallel to the river Yavari, the course of which river, up to its junction with the Amazonas, forms the remainder of the boundary between Peru and Brazil. The Amazonas is the boundary between Peru and Ecuador, from its junction with the Yavari to the town of S. Juan de Brancamoros, south of which place the river Chinchupe falls into the Amazonas. The Chinchupe separates both countries as far as its source, from which the dividing line passes over the Andes to the Rio Tumbez, which falls into the Gulf of Guayaquil, in 3° 30′ S. lat.

The length of this country from south to north, along the meridian of 70°, is above 1150 miles, but its width varies greatly. South of 17° S. lat. it hardly exceeds 30 miles, whilst near 10° S. lat. it is more than 650 miles wide. Its area, according to a rough estimate, considerably exceeds 500,000 square miles, being about two and a half times the extent of France.

Coast and Harbours.—The coast-line is about 1500 miles in length. In an extent of 1200 miles this coast forms only three straight lines, which meet at obtuse angles, and are not interrupted by any large bays. The most southern line runs south and north, the central line runs nearly south-east and north-west, and the northern line runs north-north-west. The most northern and most projecting portion of the coast is broken by bays and by headlands.

The southern coast-line, which runs south and north, extends from the mouth of the river Loa (21° 28′ S. lat.) to the harbour of Arica (18° 28′ S. lat.), a distance of 210 miles. The whole of this line consists of rocky cliffs, rarely low, and occasionally several hundred feet high. In a few spots a sandy beach lies between the cliffs and the sea. The projecting points seldom extend a mile from the mainland, and in no case more than two. They also form right angles with the coast, and as they occur only at distances of 10, 15, or 20 miles, they afford no shelter to vessels. A few small rocks lie off the coast, but they are low and too small to protect vessels which anchor between them and the shores. The soundings are irregular. Boats cannot land on these shores, as they are exposed to a very heavy swell from the Pacific, forming a dangerous surf, which can only be passed in favourable weather by boats. Landing in most places can only be effected by *balsas*. In all this extent of coast, fresh water can only be got at three places, the rivers Loa and Pisagua, and at Arica. The water of the river Loa is extremely bad. The water of the Rio Pisagua is good, but the river is dry nine months in the year, and the water obtained from the wells is bad. At Arica the water is excellent. The only harbour is that of Iquique, which is formed by a low island, the largest that occurs along this coast. Between it and the town is good anchorage in eleven fathoms. The harbour of Arica, which lies at the northern extremity of this coast-line, is also formed by a low island, called Huans, on the northern side of which there is good anchorage. A mole runs out into the sea, which enables boats to lie quietly while loading or discharging.

From Arica (18° 28′ S. lat.) to Point Carreta (14° 10′), a distance of more than 460 miles, the coast lies east-south-east and west-north-west. Where the cliffs come close to the sea, they rise from 50 to 300 feet above it, and the waves in some places break with great violence along the shore. Even the sandy beach is frequently interrupted by low projecting cliffs, but the soundings are in general regular. The projecting points are usually too short and too far from one another to form safe anchorages and to break the swell of the sea. Towards Point Carreta a few inlets occur, which form good harbours, though even here the landing in boats is generally difficult and sometimes impracticable. Fresh water is much more abundant, and may be got in several places. The first harbour which occurs, after leaving Arica, is that of Islay, the port of Arequipa. Cove Mollendo formerly served for that purpose, but it has so changed, that at present it only admits boats, or very small coasting vessels. Port Islay is formed by a few straggling islands which lie off Point Islay, and is capable of containing twenty or twenty-five vessels. The anchorage is good, but the landing extremely difficult, and at the full of the moon it is sometimes impracticable for several days. Point Lomas, the port of Acari, lies farther west, and is an open roadstead, but it has good anchorage in from five to fifteen fathoms, and tolerable landing. Some distance farther west there are two good harbours, S. Juan and S. Nicolas, with excellent anchorage and tolerable landing; but the country about them is sterile and uninhabited. Farther west is the Bay of Independencia, which lies between Cape Quemada and Cape Carreta, and is protected towards the sea by two islands, Santa Rosa and Santa Vieja, of which the latter rises to a considerable elevation. It extends 15 miles from south-east to north-west, and is about 3½ miles broad. There is anchorage in all parts of this spacious bay, the bottom being quite regular in about 20 fathoms. It may be entered from the south by the Strait of Serrate, between the island of Santa Rosa and Cape Quemada, which is three-quarters of a mile wide, or by the wide opening at the north-western extremity, which is called Dardo, and is five miles across between the island of Vieja and Cape Carreta. As the country surrounding this bay is very thinly inhabited, it is rarely visited by vessels.

The coast from Cape Carreta (14° 10′ S. lat.) to the roadstead of Lambayeque (6° 46′ S. lat.), a distance of about

620 miles, runs north-north-west, and exhibits a much greater portion of low sandy beach than is found farther south. A high ground invariably appears at the back of the low shore, in some places rising with a steep and in others with a gentle declivity. In a few places the high ground is six miles from the sea. Where the coast is high the rocks are frequently low, but in several places they rise to 100 or 300 feet. The projecting headlands are not numerous, and being short, and at right angles to the coast, they do not afford safe anchorage. Towards the south-eastern extremity are some islands, and between 7° and 10° S. lat. some inlets which are larger than commonly occur on this part of Peru, and good anchorage is found in them. The most southern of these harbours is the Bay of Pisco, which is between the mainland and a row of islands extending along the coast. The most southern of these islands, that of Gallan, is 2½ miles long, 1 mile wide, and of considerable elevation. North of it are the Ballista Islands, and north of them the Chinca Islands, both clusters of low rocks. The sea about these islands is deep, and the Bay of Pisco may be entered safely by all the passages thus formed. The most southern passage, which is between the island of Gallan and Point Paracca, is generally used; it is called the Boqueron of Pisco. Within the bay there is good anchorage in 12 fathoms. This bay is much visited by vessels, as the surrounding country is rather fertile, and the commerce of the town of Pisco is considerable.

Opposite the town of Cerro Azul there is only an open roadstead, with bad anchorage, and a heavy surf constantly breaking on the shore. The bay of Callao is between the coast and the island of S. Lorenzo, which is four miles and a half long from south-east to north-west, and a mile wide: its highest part is 1050 feet above the sea-level. The bay, which is extensive and commodious, has good anchorage; it is usually entered from the north round Cape Lorenzo, the northern extremity of the island, but it may also be entered by the Boqueron, a strait between Cape Callao and the southern extremity of the island. Salinas Bay, on the north of Salinas Head, which extends five miles into the sea from south to north, is of large dimensions, and affords good anchorage, but it is seldom visited. The bay of Sapé, to the north of Cape Thomas, is small, but as it is contiguous to a fertile district, it is much visited by coasters. The port of Guarmey, north of Point Legarto, is also small, but it contains good anchorage in three and a half to ten fathoms, on a fine sandy bottom. Firewood is abundant in the neighbourhood, and is exported. Between 9° and 10° S. lat. there are four comparatively good harbours, Casma, Samanco, or Huambacho, Ferrol, and Santa. That of Samanco is the largest port north of Callao, being six miles long from south-east to north-west, and four miles wide. The entrance is two miles wide. Port Ferrol is nearly equal in size, and entirely free from the swell of the ocean. Both harbours are much visited by coasters, as the adjacent country is fertile and well cultivated. There is no harbour farther north. Opposite the towns of Truxillo and Lambayeque there are only open roadsteads with bad anchorage.

North of the roadstead of Lambayeque, and between it and the Bay of Guayaquil, a huge promontory runs out into the sea. At its base, between Lambayeque and Point Malpelo (3° 30′ S. lat.) it is 220 miles wide, and its coast-line exceeds 300 miles. Between Point Aguja and Cape Blanco, the most projecting part of this promontory, the shores are rocky and steep, and rise to a considerable elevation; but near the roadstead of Lambayeque and on the Gulf of Guayaquil the shores are sandy and partially covered with brushwood. In this part there are two indentations, which form two tolerably deep but open bays. The southern is the Bay of Sechura, which is six miles deep, and at its entrance, between Cape Pisura and the Little Lobos Island of Payta, 12 miles wide. It is open to the swell of the sea, and is only navigated by the Indians in balsas. The Bay of Payta, which is farther north, is of smaller dimensions, but it is the best harbour on the coast of Peru, and is more visited by foreign vessels than any other harbour except Callao.

As the heavy surf occasioned by the swell of the Pacific renders landing with boats always dangerous, and often impracticable, *balsas* are used along this coast. These balsas differ in materials and form on the different parts of the coast. In Chile and the southern coast of Peru the balsa is a kind of sea-balloon, consisting of seal-skins made air-tight, and inflated like a bladder: they are so light that they float over the heaviest surf without danger. Two of these bladders are fastened together, and a sort of platform made of cane is fixed on them. These balsas hold from two to three persons. The balsa of the northern coast of Peru is a raft consisting of nine logs of the cabbage-palm secured together by lashings, with a platform raised about two feet, on which the goods are placed. They are employed for coasting along the shore, and have a lug sail, which is most used in landing. The wind being along the shore enables them to run through the surf and on the beach with ease and safety. At Lambayeque, where the surf is very heavy, a kind of balsa is used called *caballito:* it consists of bundles of reeds fastened together and turned up at the bow. Being very light, it is thrown on the top of the surf upon the beach, and the fishermen who use them jump off and carry them on their shoulders to their huts. It seems that each bay or road has its peculiar balsa.

Surface, Soil, Climate, and Agricultural Productions.—As Peru comprehends the whole of the mountain-masses of the Andes which lie between 15° and 5° S. lat., together with the countries on both declivities of the chain, it is naturally divided into three different regions. The country between the chain and the Pacific is called *Los Valles*, and that included between the higher ranges of the Andes, *Montaña*. The region on the eastern declivity of the Andes and the plains contiguous to it are not designated by a peculiar denomination; they may be conveniently called the *Eastern Region*.

I. The country between the steep ascent of the Andes and the Pacific varies in width from 15 to 50 miles, and may be considered as the western base of the mountains. It has a great elevation above the level of the sea, where it lies contiguous to the range, on an average between 8000 and 10,000 feet, and from this elevation it slopes towards the sea with a very irregular surface. Where it approaches the shores it is still in many parts from 1500 to 2000 feet above the sea-level, but in other places it is less than 500 feet. This irregularly inclined plain is furrowed by a number of depressions running from the Andes to the sea with a rapid slope. As the adjacent high lands frequently rise 1000 feet above them, these depressions are appropriately called *Los Valles*, or the Vales. They are traversed by rivers, many of which are dry during nine months in the year, and only a few preserve a running stream all the year round. As it never rains in the lower portion of this region, vegetation and agriculture do not extend beyond the reach of irrigation. The narrow strips along the rivers are cultivated in proportion to the supply of water. Though the upper course of the rivers is extremely rapid, few of them enter the sea, but are either lost in shallow lagoons or filter through the sand which is invariably found near their mouth. The uplands which separate the valleys from one another are covered with a fine loose sand, through which in many parts the rocks protrude, either in the form of isolated mountains, or more frequently in ridges several miles long. These uplands are complete deserts; neither beasts, birds, nor reptiles are ever seen on them, and they do not produce a single blade of vegetation. No stranger can travel from one vale to another without a guide, the sand being so loose that it is raised into clouds by the wind, and thus all traces of a path are obliterated. On account of the great heat which is experienced in these uplands in the day-time, and the clouds of sand which the wind then raises, they are usually traversed by night, and the guides regulate their course by the stars, or the light breeze which always blows from the south. The vales are most numerous in that part where the coast runs from south-south-east to north-north-west, between Lambayeque on the north and Cape Carreta on the south. In this part they are on an average 10 or 12 miles distant from one another, and have a better supply of water than in the other parts of Peru. Where the coast runs from north-west to south-east, between Cape Carreta and Arica, they are less extensive, and from 15 to 20 miles distant from each other. Farther south they are very narrow, and occur at greater intervals. In the most northern district the vales are more extensive, and contain considerable portions of cultivated ground, but they are at great distances from one another. Between Lambayeque and Sechura the desert is 90 miles across.

It is well known that the vicinity of the sea very materially influences the climate of countries, but the Pacific affects the climate of this region in a very extraordinary way, of which no satisfactory explanation has been offered.

Along the whole coast of Peru, south of Cape Blanco, a shower is never experienced, a drop of rain never falls. But for nearly five months, from June to November, the sky is covered with a kind of fog, which is called the *garua*. In the morning it is so thick and close to the ground that objects at a moderate distance cannot be seen. About ten or eleven o'clock the fog rises into the atmosphere, but does not break into clouds. This fog covers the sun so effectually as to intercept the rays, and the disk is hardly visible. During this period the earth is constantly covered with dew caused by the condensation of the fog. This dew is not heavy enough to penetrate the thinnest clothing, though it changes dust into mud, and fertilises the ground. While the garua covers the lower parts of the country, and constitutes their winter, the higher declivities of the Andes enjoy fine weather and have their summer. But in the month of January the rains on the mountains commence, and they last about three months. The rains occur however earlier in the year in the northern than in the southern districts: and hence it happens that the rivers in the northern part of Peru are full at the end of January or the beginning of February, while in the southern parts this does not take place before the end of March.

The climate of Peru is not so hot as might be supposed. In summer the weather is delightfully fine, and the heat is moderated by the sea and land breezes. The sea-breeze generally commences about ten o'clock; it is then light and variable, but gradually increases till one or two o'clock in the afternoon. A steady breeze prevails until sun-set, when it begins to die away; and soon after the sun is down there is a calm. About eight or nine o'clock in the evening light winds come off the land, and continue until sun-rise, when it again becomes calm, until the sea-breeze sets in. It is also supposed that the cold current which runs along this coast from south to north, and the temperature of which is on an average 8° lower than the mean annual temperature of the adjacent coast, may contribute to moderate the summer-heat. During the winter however, that is, during the fogs, the air is raw and damp, and woollen clothing is then necessary for the preservation of health. The mean annual temperature, according to Humboldt, is 72°, the maximum 82°, and the minimum 55°. In the day-time it varies between 72° and 77°, and in the night between 60° and 63°.

The prevailing winds along the coast blow from the south, varying between south-south-east and south-west. They are seldom stronger than a fresh breeze, especially along the coast south of Cape Carreta, where calms sometimes set in and last three or four days. Farther north they are stronger and blow with greater regularity; and near Cape Blanco they sometimes blow with great force. In winter light northerly winds are occasionally experienced. At some distance from the shores the prevailing winds blow from south and south-east, and with greater strength in winter than in summer: no thunder-storms occur; lightning indeed is seen from a distance, but thunder is never heard. Earthquakes are frequent, and sometimes destroy the towns and villages.

We do not know at what elevation above the sea-level the rains begin on the western declivity of the Peruvian Andes, but as travellers observe that cultivation and vegetation begin to increase at the height of from 8000 to 9000 feet, it is evident that such tracts must have the advantage of annual rains.

As the mean annual temperature of Peru does not much exceed that of the countries along the southern coast of the Mediterranean, all the grains and fruits of Spain succeed, and many of the intertropical products do not, which however seems attributable rather to the want of a sufficient quantity of moisture than of heat. Indian corn is generally cultivated, and constitutes the principal food of the Indians and lower classes. Rice is extensively grown in some of the wider northern vales, and is exported. Wheat succeeds only in the more elevated part of the valleys, where barley also is grown. Potatoes and sweet potatoes are generally cultivated, also mandioc, yams, and bananas to a smaller extent. The sugar-cane plantations are numerous and extensive, and sugar is exported to all the American countries bordering on the Pacific. Most of the fruit-trees peculiar to the southern countries of Europe succeed well, but those of England are not common; and walnuts, pears, apples, filberts, and almonds are imported from Chile. Vines grow in every valley, and good wine is made in several places, as at Pisco, Nasca, and Ica. There are olive-trees, but they do not supply an article of exportation, the consumption of olives in the country being considerable. There are few natural meadows; the want of them is supplied by the cultivation of lucern, which has spread over all the valleys.

The soil of the vales consists of sand mixed with vegetable mould, and does not possess a great degree of fertility. As it is cultivated every year, it requires a great deal of manure. This manure is obtained from the small rocky islands, and also from the rocky cliffs along the coast, which are covered with a layer of the excrements of sea-fowls, several feet thick, which appear at a distance as white as snow. A great number of small coasters are continually employed in conveying this manure, which is called *guano*, to the neighbouring anchorages, where it is bought by the cultivators of the soil.

II. The *Mountain Region*, or *Montaña*, runs parallel to the Pacific, and from 20 to 50 miles from the shores. It comprehends the central portion of the Andes, namely, the northern part of the Bolivian Andes and the whole of the Peruvian Andes. The Bolivian Andes consist of two elevated ranges running nearly parallel to one another from south-south-east to north-north-west, between 20° and 15° S. lat. The eastern chain contains the highest summits of the Andes, the Nevados of Illimani and Sorata, and though the western does not attain an equal elevation, it contains several summits which rise above the snow-line. The valley enclosed between the two ranges, called the Valley of the Desaguadero, is about 13,000 feet above the sea-level. The greatest part of it belongs to Bolivia; only about one fourth of it is within the territories of Peru. This valley is about 60 miles wide where it belongs to Peru; the climate and productions are noticed under BOLIVIA, vol. v., p. 86.

Between 14° and 15° S. lat., the two chains of the Bolivian Andes are connected by a transverse ridge, the mountains of Vilcanota, which do not attain the elevation of the eastern Bolivian Andes, but appear not to be inferior in height to the western chain, as several of their summits are always covered with snow. The limit of perpetual congelation on this chain, according to Pentland, occurs at 15,800 feet above the sea-level. The mountains of Vilcanota may be considered as forming the boundary-line between the Bolivian and Peruvian Andes.

The Peruvian Andes consist of two chains, which run in the same direction as the Bolivian Andes, from south-south-east to north-north-west, and may be considered as their continuation. The western range runs parallel to the Pacific, nearly north-west between 15° and 13° S. lat., and north-north-west between 13° and 5° S. lat. It is a continuous chain, without any break, and generally rises to 14,000 or 15,000 feet above the sea-level; only a few of its summits rise above the snow-line, and these elevated points are most numerous at the southern extremity, where the chain is connected with the mountains of Vilcanota. The Nevado de Chuquibamba attains nearly 22,000 feet of elevation, and exceeds in height the famous Chimborazo. South of it, and completely isolated, is the volcano of Arequipa, the summit of which is 17,200 feet above the sea, but it is not always covered with snow. Farther north-east are the elevated summits called Cerro de Huando and Cerro de Parinacocha. South-east of Lima is the Toldo de Nieve; between 11° and 11° 30′ S. lat. is the elevated summit called La Viuda, which rises to 15,968 feet; and north of it occur four other snow-capped summits, the Altun Chagua, which rises several thousand feet above the snow-line, and the Nevados of Pelagotas, of Moyapota, and of Huaylillas. The last-mentioned summit is situated in 7° 50′ S. lat., and north of it there are no snow-capped mountains until we come to Chimborazo (2° S. lat.). The mountain-mass north of the Nevado of Huaylillas seems to descend to an average height of 9000 or 10,000 feet.

The eastern chain of the Peruvian Andes, which is the continuation of the eastern Bolivian Andes, runs in its southern part, and as far north as 12° 30′ S. lat., parallel to the western Andes, at the distance of about 100 miles. It is composed of an almost uninterrupted series of snowy peaks, which terminate with the Nevado of Salcantahi (13° 10′ S. lat.). Farther north it sinks much lower, and north of 12° 30′ S. lat. the chain is interrupted by two large rivers, the Rio Yucay and the Rio Apurimac. On the northern banks of the Rio Apurimac the Andes again rise to a great elevation, though, so far as is known, in no place do they ascend above the snow-line. They gradually approach near the western Andes, and may be considered as united to them by the elevated table-land of Pasco, which is situated between 11° 10′ and 10° 30′ S. lat. At the northern side of this table-land both chains again divide, and run parallel to each other to 7° S. lat., where the eastern chain inclines to the east of north, and continues in that direction to the banks of the Amazonas, at the famous Pongo de Manseriche. Where both ranges run parallel, they are hardly more than 50 miles distant from each other, but near 5° S. lat. they are 120 miles apart. In the northern portion of the eastern chain there are a few snowy peaks, as the Paramo de Caracalla (near 7° S. lat.) and the Paramo de Piscoyana (south of 5° S. lat.).

The country included by these two ranges contains four regions, which differ materially in climate and productions. They may be called the table-land of Cuzco, the valley of the Rio Jauja, the table-land of Pasco, and the valley of the Marañon.

The *table-land of Cuzco* extends from the mountains of Vilcanota, its southern boundary, to about 12° 30′ S. lat., or more than 150 miles from south to north, and about 100 miles from east to west. Its surface is very uneven, being traversed by several ridges of broad-backed hills rising with a tolerably steep ascent, and running from the south, where they are connected with the mountains of Vilcanota, towards the north-north-west, parallel to the great chains of the Andes, which enclose this region. The valleys between these ridges are usually several miles wide, but their surface is diversified by low eminences. The whole region declines towards the north. The town of Cuzco (13° 31′ S. lat.) is 11,380 feet above the sea-level. We may reasonably infer that the districts south and west of that place are more elevated. But the rapid course of the numerous rivers which descend northward, shows that this plain lowers rapidly towards the north; and on the banks of the Rio Mantaro it probably does not exceed 8000 feet above the sea. This is also confirmed by the agricultural products. In the most elevated districts south and west of Cuzco the only cultivated grain is the quinoa (chenopodium quinoa), which is also the case in the valley of the Desaguadero. [Bolivia, vol. v., p. 87.] In the parallel of Cuzco the climate is favourable to the growth of wheat, Indian corn, and the fruits of Europe, but the last require a good deal of care, and the fruits usually met with between the tropics do not succeed. In the lower parts of the valleys north of 13° S. lat. the agricultural products consist of Indian corn, sweet potatoes, yucas, and plantains. The sugar-cane succeeds very well, and is cultivated in some parts, but not extensively. The mountains which enclose these valleys are covered with thick forests, but trees are scarce in the more elevated districts, and in some of them are entirely wanting. We are not acquainted with the climate of this region, except that there is a good deal of rain all the year round. In the valley of Paucartambo rain falls 300 days in the year.

The Vale of the Rio Jauja extends from the table-land of Pasco on the north, about 100 miles southwards, between both ranges of the Andes, and in the widest part may be about thirty miles across. Its descent from the table-land is very rapid. At its southern extremity, near 12° 30′, it is probably less than 8000 feet above the sea-level. Though this valley is the most populous district of Peru, and contains several comparatively large towns, our information respecting its climate and productions is very scanty, none of the modern travellers who have visited Peru having directed their steps to this region. We only know that the northern districts produce abundance of wheat, Indian corn, and the fruits of Europe, and that in the southern, yucas, plantains, and mandiocca are cultivated, and that the sugar-cane and tobacco are grown to a considerable extent.

The table-land of Pasco has lately been more visited by travellers than any other part of the interior of Peru, the Andes here being crossed by one ascent and one descent. The ascent from the Pacific is near the high summit called La Viuda, about 11° 10′ S. lat. and 76° 30′ W. long., and the descent is north of the Cerro Pasco, near 10° 30′ S. lat. and 75° 40′ W. long. The width of the table-land from south-west to north-east is about 60 miles, and in these parts it is enclosed by ranges which rise from 500 to 1000 feet above it. Its length cannot be determined, as the mountain-masses are broken, towards the north-west and south-east, by numerous river-courses, and do not constitute a determinate boundary, but sink imperceptibly lower. It is the highest of the table-lands enclosed within the Andes, the level parts being 14,000 feet above the sea-level. As the snow-line in this part of the Andes seems to occur about 15,500 feet above the sea, the surface of the table-land is only 1500 feet below it, which renders the climate so cold that it would have remained uninhabited but for the rich mines of Pasco, which have attracted a numerous population. The mean annual temperature probably does not exceed 40°, which is equal to that of Trondhiem in Norway, but the climate is much more disagreeable, as nearly all the year round it resembles that of the month of April at Trondhiem. Even in the midst of summer, from May to November, the nights are cold, and at sun-rise all the country is covered with hoar-frost, at which time the thermometer indicates 32°. At nine o'clock it rises 4° or 5°, and in a short time a considerable degree of heat is experienced. But the sky, which is serene in the night-time, is soon covered with fogs accompanied with a strong wind. This is followed by a fall of snow mixed with hail. This state of the weather sometimes continues for several hours; but at other times some fine intervals occur. In the afternoon, storms are frequently experienced, accompanied by frightful thunder and hail, which sometimes cause great loss of property and life. In April, two or three weeks generally pass without storms and night-frosts. In the winter, from November to March, the weather is much worse, as the snow-storms then last for weeks together. Even when the sky is serene and of a dark-blue colour, the sun looks as if it were eclipsed. The table-land is a plain divided into a considerable number of smaller plains by ridges of low hills rising a few hundred feet above their base. The surface of the level parts consists partly of bare rocks or sand. The sand is partly covered with peat, or by swamps, intersected with grassy tracts, which serve as pasture-ground for the llamas, which are kept in considerable numbers for the purpose of carrying the ore from the mines to the smelting-places. A great number of lakes are dispersed over the plain. They are very deep, and are the sources of some of the largest tributaries of the Amazonas. In the northern part of the plain is the lake of Llauricocha, the source of the Marañon, which is considered as the principal branch of the Amazonas. In the southern district is the lake of Chinchaycocha, of large dimensions, from which a river issues which is the principal branch of the Jauja, and consequently one of the greatest affluents of the Rio Ucayale. Near the eastern edge of the table-land is the lake of Quiluacocha, whence the Rio Huallaga, an affluent of the Amazonas, issues. Nothing is cultivated on this table-land, not even the quinoa.

The Vale of the Rio Marañon extends from 10° to 5° S. lat. The southern part is very narrow, the river running in a valley so contracted, that it is merely a wide ravine. This ravine continues to about 8° S. lat., where it gradually enlarges to a valley several miles wide, and more than 200 miles long. The southern part of this valley is probably not much more than 3000 feet above the sea-level, and it lowers very gradually; at its northern extremity, at the Ponga of Rentema, it is only 1250 feet above the sea. The lower part of the valley, north of 7° S. lat., is many miles wide, but not a level, as several offsets from both chains of the Andes advance some miles into it, and in several places within a short distance of the river. This valley is by far the hottest portion of the mountain region, and the vegetation in the lower parts does not differ from that of other tropical countries. Wheat is only grown on the declivities of some adjacent mountains. Indian corn, mandioca, plantains, and yucas are most extensively grown for the consumption of the inhabitants, and the sugar-cane and tobacco for exportation. We know nothing of the climate of this valley except that the heat is very great and that it has the advantage of rains. Though hardly less populous than the vale of the Jauja, it has been little visited by modern travellers.

On the west side of the Peruvian Andes, the region of the tropical productions does not ascend more than 2000 feet above the sea, but in the valleys of the mountain region it rises to between 4000 and 5000 feet, probably owing to the abundant rains which fall on the latter. The cultivated grains of this region are rice and Indian corn, and the other products are plantains, bananas, mandioca, yams, camotes, and the sugar-cane. The principal fruits are grapes, anonas, pine-apples, papaws (carica), and cherimoyers. Above this region is that of the European cerealia, which towards the Pacific reaches to 10,000 feet, and in the valleys to 12,000 feet and upwards. The grains cultivated in this region are wheat, barley, and Indian corn; potatoes and different kinds of pulse are also cultivated. The fruit-trees are those of Europe, among which the peach succeeds best. Above this region only quinoa and barley are cultivated; the latter for fodder. Potatoes succeed at a height exceeding 13,000 feet. There are no forest-trees on the western declivity of the Andes below 8000 or 9000 feet, but in the interior of the mountain region they increase in size and number in proportion as the country declines in height, and the lowest districts are covered with nearly impenetrable forests of lofty trees.

Several roads lead from the coast of the Pacific to the interior of the mountain region. Six of these roads occur south of 15° 20′ S. lat. These roads lead from Arica, Arequipa, &c., to the valley of the Desaguadero, and are named from the mountain-passes through which they lead. The most southern is the Pass of Las Gualillas (17° 50′ S. lat.), which is 14,830 feet high, and a little farther north (17° 43′) is another pass of the same name, the highest part of which is 14,200 feet. The Pass of Chullunquani (17° 18′ S. lat.) is 15,600 feet high. The lowest and most frequented pass in these parts is that of the Altos de los Huessos; it runs at the foot of the volcano of Arequipa, and where it passes the Andes (16° 21′ S. lat.) it is only 13,573 feet high. The Pass of the Altos de Toledo (16° 2′) rises to 15,528 feet, and the Pass of Lagunillas (15° 22′ S. lat.) to 15,613 feet. The last-mentioned pass, which is the most elevated, is situated where the mountains of Vilcanota join the Western Andes. A mountain-pass leads over the mountains of Vilcanota from Santa Rosa, in the valley of the Desaguadero, to Cuzco. We are imperfectly acquainted with the roads which traverse the Andes north of 15° 30′. A pass leads from Lima to the town of Huancabelica, the highest point of which is 15,080 feet above the sea-level. Farther north is the pass called Portachuela de Tacto, through which the road from Lima to Tarma passes; it is 15,760 feet high. The road which leads from the coast to the table-land of Pasco traverses the Pass of the Alto de Jacaibamba, which is 15,135 feet high, and also that of the Alto de Lachagual, which rises to 15,480 feet. The pass by which travellers descend from the table-land of Pasco to the valley of the Rio Huallaga does not exceed 14,000 feet, and runs in a ravine of the table-land. A road leads from the town of Truxillo to Caxamarca, in the vale of the Marañon, which in the Pass of Micuipampa is 11,604 feet above the sea-level. From Caxamarca a road leads northward to Chachapoyas, and from the last-mentioned place, over the Eastern Andes, to Moyabamba and Tarapoto. The most northern mountain-pass in Peru occurs near 5° S. lat., and leads over the Paramo of Guamani, where it attains the elevation of 10,950 feet above the sea-level.

III. The *Eastern Region* comprehends the eastern declivity of the Andes and the adjacent plains, as far as they belong to Peru. It is the least known portion of that country, and our information about it is extremely scanty, except as to the vale of the Rio Huallaga. This extensive valley lies east of the vale of the Marañon, being separated from it by the Eastern Andes. It extends from 10° 30′ to 7° 30′ S. lat., about 350 miles in length. The most southern part, as far north as 9° 30′ S. lat., is narrow. In this part the descent is rapid. Huanuco is about 9000 feet above the sea-level, but at 9° 30′ S. lat. the valley is probably not more than 4000 feet high. At this place it begins to widen, the Eastern Andes receding to the distance of 15 or 20 miles from the river. This may be the width of the valley to 7° S. lat., where a branch of the mountains comes close up to the river, and as high hills approach also on the east close to its banks, they form, near 6° 30′, the Pongo of Huallaga, at which the valley terminates on the north. The country north of the Pongo is quite level, and belongs to the alluvial plain of the Amazonas. The eastern boundary of the vale is formed by a range of hills, which south of 9° 30′ S. lat. probably do not fall short of 10,000 feet above the sea-level, and between 7° and 6° 30′ S. lat. rise to a considerable elevation, but between these two points they are of moderate height. The soil of the wider portion of the vale is chiefly alluvial, and as it combines great fertility with abundance of moisture and a great degree of heat, it is capable of maintaining a numerous population. At present however it is thinly inhabited, though the population of late is said to have increased considerably. There are at least one hundred very rainy days in the year, and these occur particularly in October and November. It does not appear that the dry and rainy seasons are distinguished as in other countries, showers being frequent all the year round. The heat is great, and during the rain it is frequently oppressive. The declivities of the mountains which enclose the vale are covered with thick forests of tall trees, which is also the case with the greatest part of the vale itself. Wheat and barley are grown in the southern and more elevated districts, whence they are sent to the table-land of Pasco. In the lower part, Indian corn, two sorts of plantains, and three sorts of bananas are cultivated. There are also plantations of sugar-cane, coffee, cacao, and coca. The coca is an herb much used by the Indian population, who chew it with a small quantity of lime. Fruit is here produced in greater perfection than in any other part of Peru. There are thirty-two kinds of fruit-trees. Many of these trees hardly require any care at all. There are eighteen different sorts of vegetables.

The country to the east of the range of hills which form the eastern boundary of the vale of the Huallaga, and extending from their base to the banks of the Rio Ucayali, is known under the name of *Pampa del Sacramento*. The term 'pampa' is applied in South America to level plains destitute of trees, and hence it was supposed that this part of Peru was of this description. But according to the latest information, this country is covered with woods, though they are not so dense as the forests in the vale of the Rio Huallaga. The surface also is not a level, except along the banks of the Rio Ucayali. At some distance from this river the country is diversified by numerous eminences. This country extends from the banks of the Amazonas to the Rio Pachitea, more than 300 miles from north to south, with a breadth varying between 40 and 100 miles. North of 7° S. lat. it is a dead level, and forms part of the alluvial plain of the Amazonas. As no European settlements have been established in this part of Peru, we are very imperfectly acquainted with its climate and productions. It does not suffer from oppressive heat, as the thermometer ranges only between 75° and 85° when the sun passes over the zenith In fertility and products it does not seem to be inferior to the vale of Huallaga. It is still in possession of the native tribes, of which a small number have embraced Christianity.

The country extending from the eastern banks of the Rio Ucayali to the river Yavari, which separates Peru from Brazil, is entirely unknown, except so far as it has been seen by travellers who have sailed on the Ucayali and Amazonas, where it appears to be flat and covered with woods, exactly resembling the Pampa del Sacramento in its principal features. Some hills of considerable elevation rise on the plain between 74° and 75° W. long.; and north of 7° S. lat. they are called the Sencis Hills. It is not known whether these hills extend in an uninterrupted chain south-east and then southward, until they join the eastern chain of the Andes, near 12° S. lat.; but this is the direction given to them in our maps.

The Pampa del Sacramento extends southward to the banks of the river Pachitea. The country which extends south of the last-mentioned river, from the eastern chain of the Andes to the Rio Ucayali, is likewise entirely unknown. According to information collected from the native tribes that live in this part, it is chiefly covered with mountains, which attain a great elevation near the Andes, but towards the Ucayali sink into hills. The country along its banks seems to be rather flat; it is also said to be entirely covered with forests, except in the highest summits of the mountains.

Rivers.—The rivers which descend from the western declivity of the Western Andes and fall into the Pacific have a short course, and flow with great rapidity. They are also shallow, and have very little water during the greater part of the year; many of them are quite dry for several months. Accordingly they cannot be navigated even by the smallest canoes, but the water is used to irrigate the adjacent flat tracts.

All the large rivers of Peru originate within the mountain-region, and all the waters which collect in it are united in three large rivers, the Marañon, the Huallaga, and the Ucayali. These three rivers may be considered as the principal branches of the Rio Amazonas. The Marañon, which is commonly considered as the principal branch of the Amazonas, issues from the lake of Llauricocha on the table-land of Pasco, and runs north-north-west about 150 miles in a narrow valley, and with great rapidity. In this distance it descends not less than 10,000 feet. It then flows in a wide valley for more than 250 miles to the Pongo of Rentema, and in this valley its course is rather gentle, as it descends only from about 3000 to 1232 feet. It is navigated by balsas and canoes. Near Tomependa is the Pongo of Rentema, a rapid. From this place the river turns to the north-east, and after flowing about 70 miles in that direction, it turns to the east; after a course of 70 miles more it descends into the plains by the Pongo de Manseriche, a rapid about seven miles in length. Between the Pongos of Rentema and Manseriche the river runs between lofty rocks, which sometimes rise to the height of 1000 feet, and never sink below 40 feet. It is full of eddies and rapids, and can only be navigated by balsas. At the foot of the Pongo de Manseriche is the town of Borja (in Ecuador), from which place the river is navigable for vessels drawing not more than seven feet. After its union with the Huallaga and Ucayali its depth is so much increased that it is navigable for the largest vessels.

The Huallaga, which joins the Marañon near 5° S. lat. and 76° W. long., rises in the lake of Quiluacocha, which is also on the table-land of Pasco, south-east of the lake of Llauricocha. It runs more than 500 miles. The southern half of its course is north-north-west, and the northern half north-north-east. The upper part of its course is full of rapids, which however may be descended, though not ascended. These rapids cease at Juan del Rio, south of 9° S. lat.; and the river, though rapid, affords an easy navigation as far north as 8° S. lat., where several rapids again occur. There are no rapids between 7° 30′ and 6° 40′ S. lat. Farther north occur the last rapids, which render the river nearly unnavigable for about 30 miles. North of 6° 20′ S. lat. the Huallaga flows through a level marshy plain to its junction with the Marañon, and is navigable for vessels of considerable size.

The Ucayali brings to the Amazonas the drainage of the mountain-region situated between 11° and 15° S. lat. This large river is formed by the junction of the rivers Urubamba and Tambo, which takes place near 9° S. lat. The Urubamba is formed by the union of the rivers Paucartamba and Quilabamba, which drain the eastern portion of the table-land of Cuzco, and running north, meet near 11° 30′ S. lat. These rivers are too rapid to be navigable, but the Urubamba is stated to be navigated by the natives. The Rio Tambo is formed by the confluence of the rivers Apurimac and Mantaro. The Apurimac, which drains the western portion of the table-land of Cuzco, unites with the Mantaro, which drains the valley of the Jauja, and in its upper part is called Rio Jauja. [APURIMAC.] These rivers do not appear to be navigable. The Tambo, which is formed by their union, is probably navigable, but it flows through a country in which no European settlements have been formed. Not far below the place where the Urubamba and Tambo by their union have formed the Ucayali, is a great rapid or cataract called Vuelta del Diablo. From this place downward the river runs above 500 miles, first north-north-west, and afterwards north-north-east, and no impediment to navigation occurs in this part of its course. It is navigable for large vessels. Among its chief tributaries is the Rio Pachitea. This river originates on the eastern declivity of the mountains which enclose the upper vale of the Huallaga on the east near 10° S. lat., and runs first east and then north, falling into the Ucayali near 8° 30′. As nearly the whole course is free from impediments to navigation, it has been supposed that it might be used as a channel for the exportation of the produce of the eastern districts of Peru, in preference to the Huallaga, the course of which is interrupted by many rapids and cataracts; but as the banks of the Pachitea are inhabited by native tribes who are in a state of continual enmity with the whites, it has been found impossible to establish a regular navigation on it.

Productions.—The trees and plants which are objects of cultivation have been already enumerated. The forests, with which the mountain-region and the eastern country are covered, supply several articles for commerce and for domestic use, such as vanilla, sarsaparilla, copaiva, caoutchouc, and several kinds of resins and gum; also various barks and woods, used as dyes, such as Brazil-wood, logwood, mahogany-bark, and annotto. The indigo-plant grows spontaneously. Jesuits'-bark is met with in several places on the Eastern Andes. There are various kinds of lofty trees, useful as timber or for cabinet-work, as mahogany and cedar.

Domestic animals are far from being abundant in Los Valles, on account of the want of pasture. There is a good supply of horses, and still better of mules, which are used for the transport of merchandise. On the elevated table-land of Pasco, and in other mining districts, llamas are kept for that purpose. A llama carries about 130 pounds, or half the load of a mule. Cattle are abundant in the mountain-region, where the declivities supply extensive pasture-grounds; and in some places sheep abound, especially where the situation is too cold for cattle.

Nearly all the wild animals peculiar to South America are found in Peru, as the jaguar, the puma, the spectacled bear, sloths, armadillos, ant-eaters, guanacoes, and vicuñas. Several species of monkeys occur in the eastern region, where they are used for food and dried for preservation. The condor inhabits the most elevated parts of the Andes. Parrots, parroquets, and macaws are numerous in the woods on the mountains. Whales and seals abound along the coast, and this branch of fishery is chiefly carried on by vessels from the United States of North America. Fish are plentiful in the large rivers of the eastern region, where they constitute the principal food of the inhabitants, together with the manatee and turtles. The manatee occurs only in the Ucayali and the lower part of the Huallaga. The oil extracted from the eggs of the turtle is an article of export under the name of manteca. Alligators are numerous in these rivers, and they are often thirty feet long.

Peru is noted for its wealth in silver and gold. The number of mines which have been worked is above a thousand; but most of them are exhausted, or at least abandoned. Among those which are still worked, the mines of Pasco are the richest. Formerly the annual produce of these mines amounted to eight millions of dollars, or 1,800,000*l.*; but at present it probably falls short of half that sum. There are quicksilver-mines near Huancabelica, which were formerly very rich: we do not know in what state they are now. Copper, iron, lead, and brimstone are found in several places. Saltpetre is found in the country adjacent to the Pacific, south of Arequipa, and great quantities of it are exported by English vessels. It is not a nitrate of potash, but of soda. Salt is collected on the coast north of Callao, at Point Salinas, and in Sechura Bay, where there are salinas, or salt-ponds. Nearly all the mines of the precious metals are on the most elevated parts of the Andes above the line to which cultivation extends, a circumstance which renders the working of these mines very difficult and expensive.

Inhabitants.—No census having been taken, the population is vaguely estimated at 1,800,000, composed of creoles, or descendants of Europeans, Peruvian Indians, and a mixed race. The greater part of the eastern region is in possession of independent tribes, and only those natives who inhabit the vale of the Huallaga have been converted and subjected to the government of the whites. The number of creoles is stated to amount to about 250,000, and that of the Peruvian Indians to near 1,000,000; the remainder are a mixed race, the offspring of Europeans and Indian women.

The Peruvian Indians inhabit the Valles and the Montaña, to the exclusion of all other native tribes. They speak the Quichua language, which is generally called the language of the Incas, and which is used by all the natives of South America, from Quito near the equator, to Tucuman in La Plata, 27° S. lat. The Peruvian Indians had attained a considerable degree of civilization at the time of the arrival of the Spaniards, a fact which is proved by the numerous ruins of extensive buildings, the remains of the great artificial road which leads through the Montaña from Quito to Cuzco, and thence southward over the valley of the Desaguadero; and more particularly by the fact that they irrigated the low tracts in the vales by making cuts to convey the water from the small rivers over the fields, and by the judicious manner in which the water was distributed. It may be said that their condition has been improved by the conquest, inasmuch as they acquired iron implements and domestic animals to assist them in their agricultural labour; but they have not been benefited in any other respect. These Indians apply themselves particularly to agriculture, and there are numerous villages, and even small towns, the whole population of which now consists of Peruvians. They also work in the mines, and manufacture different kinds of woollen and cotton cloth. These kinds of manufactures existed before the arrival of the Spaniards, and must have existed in a country where the climate obliges the people to put on warm clothing for several months in the year. They are also fishermen, and sail with their balsas along the coast from one small port to another to exchange their different productions.

The native tribes which inhabit the vale of the Huallaga river have been converted, and are nearly equal in civilization to the Peruvians. The Shanamachos live on the eastern banks of the Huallaga, and on the western are the Cholones, Sharras, and Ibitas. They all seem to belong to one nation, as they speak one language, called the Ibita, though most of them understand the Quichua. They cultivate the grains and roots which have been mentioned as the principal productions of this valley. Their dwellings are much inferior to those of the Peruvians, which however may be attributed to the circumstance of their country not being exposed to cold weather. They have adopted a decent dress, except that they wear no covering for the head or feet, which they stain blue.

The independent native tribes inhabit the low and level country east of the mountain region. It is more than probable that all these tribes are not known, even by name. South of 12° S. lat., on the east of the Andes, are the Chunchos and Tuyoneris. The Antes inhabit the country where the Paucartamba and Quilabamba unite, between 12° and 11° S. lat. North of 11°, and as far north as 9° S. lat., are four tribes, the Tampas, Palutuniques, Chuntaguirus, and Piros. The country on both sides of the Pachitea river is in possession of the numerous and warlike tribe of the Cashibos, who are said to be cannibals, and do not permit strangers to enter their country. They have advanced as far north as 8° S. lat. North of them, between the Huallaga and Ucayali, are the Conibos, Setebos, and Shipebos; and still farther north two small tribes, the Maparis and Puinaus. Between the Ucayali and Yavari are the Amajuacas (between 9° and 8°), the Remos (between 8° and 7°), the Sencis and Capanaguas (7° and 6°), and the numerous tribe of the Mayorunas, who occupy the country to the very banks of the Amazonas. The tribes inhabiting both banks of the Ucayali speak one language, or dialects which differ very little from one another. This language is called Pano. Some of these tribes have been partially converted to Christianity, as the Conibos, Setebos, and Shipebos, but the missionaries have made no impression on the other tribes, and no attempt at conversion has been made among some of them. Since Peru has obtained its independence, the missions have been much neglected, and many of the converted Indians have returned to the woods, and are again lost to civilization. The converted tribes are agriculturists, which is also the case with several of the unconverted tribes, as the Chunchos, Antes, Remos, and Sencis; but they cultivate only small patches of ground, and prefer wandering about in the forests in pursuit of game. The converted tribes wear clothing, but the others go quite naked. None of these tribes have any chief, but they all live in a state of perfect equality. Even in their excursions against their enemies they have no leader, but each warrior acts individually, and appropriates to his own use all the plunder or prisoners that he takes. They use a few articles of European manufacture, as hatchets, knives, scissors, needles, buttons, and some glittering baubles. They procure these articles either at Nauta on the Amazonas or at Sarayacu on the Ucayali. The Chuntaguirus, who are the most remote from all the settlements of the whites, ascend the Ucayali and Urubamba to the confluence of the Paucartamba and Quilabamba, where they procure by barter such articles as they want, giving in exchange parrots and other birds, monkeys, cotton robes white and painted, wax, balsams, the feet of the tapir, feather ornaments for the head, and jaguar and other skins.

Political Divisions and Towns.—Peru is divided into eight departments, Truxillo, Junin, Lima, Huancabelica, Ayacucho, Cuzco, Arequipa, and Puno. The countries inhabited by the independent tribes are not comprised in these departments.

1. The department of *Truxillo* extends over the northern districts of the republic, from the shores of the Pacific to the basin of the Rio Huallaga, and comprehends the Valles north of Santa (near 9° S. lat.), the lower and wider portion of the vale of the Marañon, and likewise the greater part of that of the Rio Huallaga. The mountains contain many mines, several of which are still profitably worked. It also produces great quantities of sugar, which is exported. On the eastern chain of the Andes, in a district called Huamalies, a great quantity of Jesuits'-bark is collected. The number of creoles is comparatively small, and that of the Indians very great. There are numerous ruins of antient buildings in the Valles and vale of the river Marañon. Payta is a commercial town with an excellent harbour, which in 1835 was visited by upwards of 4000 tons of shipping. The town, which is built on the slope and at the foot of a hill, contains 5000 inhabitants. It is the port of the fine vale of the Rio Piura, which contains 75,000 inhabitants, and is a place of much business, as communication with Europe by the way of Panamà is more expeditious than at any other port of Peru. The town of S. Miguel de Piura, built on the banks of the river, about 20 miles from Payta, contains a population of from 8000 to 9000, and some manufactures of soap and leather. Lambayeque is situated in a district which produces abundance of rice and has a considerable commerce, though the roadstead is bad. It contains about 4000 inhabitants, and exports bullion and rice. Truxillo, founded by Francisco Pizarro and named after his birthplace, is situated in the middle of the extensive valley of Chimu, about two miles from the sea. The harbour Huanacho is an open roadstead. The streets of Truxillo are wide and regular, and it has a fine cathedral and a handsome townhall. The principal articles of export are bullion, sugar, and rice. Population 9000. The valley of Chimu contains the ruins of a large Indian town. In the vale of the Marañon are the towns of Caxamarca and Chachapoyas. Caxamarca stands on the eastern declivity of the Western Andes, in a rich mining district: it is nearly 9000 feet above the sea-level, and contains 7000 inhabitants and the ruins of a palace of the Incas. Cotton and woollen cloth are manufactured to a considerable extent, and also many utensils of iron. In the neighbourhood there are hot springs, called the baths of the Incas. The richest mine in the vicinity is that of Qualgayac, not far from Chota. The town of Chachapoyas is near the western declivity of the Eastern Andes, on the road which leads to the vale of the Rio Huallaga, and contains 3000 inhabitants. Much tobacco is raised in the neighbourhood. In the vale of the Rio Huallaga are the towns of Moyobamba and Tarapoto. Moyobamba, near the eastern declivity of the Eastern Andes, has 5000 inhabitants, and Tarapoto, a few miles from the Huallaga river, about 4000. In both towns a coarse cotton stuff called *tucuya* is made; and cotton, gums, resin, and white wax are sent to the coast of the Pacific by the road which leads from Tarapoto to Truxillo.

2. The department of *Junin* was formerly called *Tarma*, from the principal town, but the name was changed to commemorate the battle gained by Bolivar on the plain of Junin in 1824. It occupies the valleys along the Pacific which lie between Santa and Barranca (near 11° S. lat.), and comprehends the upper vales of the rivers Marañon, Huallaga, and Jauja, and also the table-land of Pasco. Besides the produce of the rich mines, this department exports sugar, rice, and Indian corn. The greater part of the district of Huamalies, in which bark is collected, belongs to this department. The Indian population is still greater in proportion to the creoles than in Truxillo. There are several ruins of antient buildings, but they are not considerable. None of the towns situated in the Valles are important in a commercial view. The fertile valley of the Rio Nepeña contains the towns of Huambacho and Nepeña; the last-mentioned town seems to be a place of some size. They export their produce, sugar and grain, from the excellent harbour of Samanco or Huambacho. Farther south is the town of Guarmey, in a country which is covered with lofty trees, whence great quantities of fire-wood are sent to Lima. It has only from 500 to 600 inhabitants. The small towns of Barranca and Supé export their agricultural produce to Lima from the bay of Supé. In the upper vale of the Marañon is the town of Huari, with 7000 inhabitants, and Caxatambo, which has some mines in the neighbourhood. Pasco or Cerro Pasco is built on the table-land of Pasco, 14,278 feet above the sea-level. It is probably the most elevated place in America, if not in the world, which is permanently inhabited. This town, whose population fluctuates, according to the produce of the mines, between 12,000 and 16,000, is irregularly built on very uneven ground. The site on which it stands abounds in silver ore, and the mouths of the mines are frequently in the middle of the streets. Only those mines are worked which

contain rich ores. The houses are low, and some have small glazed windows; but the suburbs are merely a collection of mud cottages. As the surrounding country is destitute of trees, it is fortunate that coal abounds in the neighbourhood. In the upper vale of the Rio Huallaga, north-east of Pasco, is the town of Huanaco, with 9000 inhabitants, which owes its prosperity to the circumstance of its agricultural produce finding a ready sale at Pasco. In the neighbourhood there are ruins of considerable extent. In the vale of the Rio Jauja is the town of Tarma, with 6000 inhabitants, in which cotton and woollen stuffs are manufactured.

3. The department of *Lima* extends along the coast from Barranca (11° S. lat.) to Point Penates (15° 30′), and comprehends that part of the maritime region in which the valleys are most numerous and occur at short distances from one another. It extends inland to the lower declivity of the Western Andes. All the productions of the vales grow here, and are tolerably abundant. The population contains a greater proportion of creoles than that of the other departments. There are some extensive ruins of antient buildings and towns. North of Lima is the town of Huacho, built in an extensive and fertile valley about one mile from the port, which is small, but has good anchorage. Lima, the capital of the republic, is about 6 miles from Callao. [Lima; Callao.] South of Callao is the small town of Chorillos, built on a cliff at the foot of the Morro Solar, a remarkable cluster of hills; it is chiefly used as a bathing-place for the inhabitants of Lima. In the fertile and well-cultivated valley of Lurim, which is a few miles farther south, are the ruins of the antient city of Pachacamac. Cerro Azul, farther south, in the middle of a fertile valley, is a considerable place, and exports large quantities of rum, sugar, and chancana, a sort of treacle. Pisco, built on a plain, about a mile from the shores of the Bay of Pisco, has above 3000 inhabitants. It has a considerable commerce, and exports wine, a kind of spirit called Pisco or Italia, and sugar. South of Pisco are two small towns, Yca and Nasca, in which much wine is made, and exported to other parts of Peru; but it is inferior to that of Pisco.

4. The department of *Huancabelica* lies east of Lima, and extends over the Western Andes and the lower vale of the Jauja. The mountains contain a great number of mines, and several of them are still worked with profit. The fertile vale is well cultivated and inhabited, as it supplies the mining district with provisions. The number of creoles is considerable. The capital, Huancabelica, is built in a ravine between mountains whose summits rise to the height of 13,000 feet, and which contain several mines of gold, silver, and quicksilver; the quicksilver-mines are rich. The town has 5000 inhabitants. Nothing is cultivated in the neighbourhood. Castro Vireyna, farther south, is in the centre of another mining district. In the vale of the Rio Jauja is Jauja or Atanjauja, a town with 3000 inhabitants, and some silver-mines in the neighbourhood.

5. The department of *Ayacucho* received its name from the plains of Ayacucho, on which General Sucre, on the 9th of December, 1824, defeated Canterac, the viceroy of Peru, and put an end to the dominion of Spain in South America. It extends over a part of the Western Andes, the western lower portion of the table-land of Cuzco, and the valley of the Rio Mantaro. The principal productions are the cerealia and fruits of Europe. The population consists of Indians: whites are only found in the town. The capital is Huamango, a large place with 26,000 inhabitants, founded by Francisco Pizarro, in an elevated situation, on the declivities of some mountains of moderate elevation above their base. It contains several large private buildings of stone, covered with tiles. The suburbs, which are inhabited by Indians, are large, and the houses better than in other Indian towns. It has a fine cathedral, a university, and a seminary for clergymen. The rich creole families that live in this town have large sugar-plantations in the valley of the river Mantaro. As the town is situated on the road leading from Lima to Cuzco, it has a considerable trade. Some miles east-north-east of the town are the plains of Ayacucho. North of it is Huanta, a small town, in a district rich in agricultural produce, especially wheat and Indian corn.

6. The department of *Cuzco* extends over the whole of the southern and over the greater portion of the northern part of the table-land of Cuzco. The Peruvians are very numerous in this country, and in many places ruins of antient buildings occur. The southern districts contain extensive pasture-grounds: those situated in the middle produce wheat and the other cerealia of Europe, with Indian corn in abundance, and the southern have extensive plantations of sugar and other intertropical plants. In the southern districts are several mines, but few of them are worked. Besides the capital, Cusco, or Cuzco [Cuzco], there is no town of importance in this department. Abancay, in the narrow valley of the upper Apurimac, is a small place. The plain which lies east of the eastern Andes contains a small number of plantations near the base of the mountains; they belong to this department, and border on the country of the Chunchos Indians.

7. The department of *Arequipa* extends along the coast of the Pacific from Point Penates (15° 30′ S. lat.) to Point Sama (18° S. lat.), and inland to the declivity of the western Andes. It contains a smaller number of vales than the department of Lima, but several of them are extensive, especially that of the Rio Chila or Arequipa, in which the town of Arequipa stands. The commercial products consist chiefly of wool and cotton. There are more creoles than in any other department except Lima. Acari, not far from the boundary of the department of Lima, is built in a fertile plain several miles from the sea. It is a considerable place, but little visited by travellers. The port, called Point Lomas, has good anchorage and tolerable landing. Islay, the harbour of Arequipa, contains about 1500 inhabitants. It is built on the west side of a hill which slopes gently towards the harbour. The trade is flourishing, and it exports bark, wool, and specie. On the north-east of the capital, Arequipa [Arequipa], stands the volcano of Arequipa, 17,200 feet high. There is always snow on the north-west side of its summit. Ylo is a small place on the coast.

8. The department of *Puno* extends along the Pacific from Point Sama (18° S. lat.) to the Rio Loa, which constitutes the southern boundary of Peru. It comprehends also that part of the valley of the Desaguadero which belongs to Peru. The vales along the coast are small, and in general 20 miles from one another. The rivers which drain these valleys have in general water only during three months of the year. In the barren tracts which divide the valleys much saltpetre is collected, and in some silver and copper ore are found. The population is more scanty than in any other part of Peru, and chiefly consists of Indians. The principal town on the coast is Arica, which contains a population of about 3000 souls, who live in low houses built of sun-dried bricks. [Arica.] It is the port of Tacna, a town built in the same valley about 30 miles from it, and the depôt of European merchandise for the consumption of the department of Puno and the greater part of the republic of Bolivia. Tacna contains 7000 souls and several well-built houses. Yquique (20° 12′ S. lat.), with a bad roadstead, has only 1000 inhabitants; a considerable quantity of saltpetre is shipped here. Near the lake of Titicaca, in the valley of the Desaguadero, are the towns of Puno, the capital of the department, which has a population of 9000 inhabitants, and Chuquito, with 5000. In the vicinity of Puno are numerous silver-mines, which in 1805 yielded 96,528 marcs of silver, but since that time the produce has fallen off.

In the countries of the independent tribes there were formerly several *missiones*, or stations of missionaries, who collected a number of aborigines and tried to convert them to Christianity. Nearly all these missions have been destroyed by the political changes to which Peru has been subject during the last twenty years. Only one of them is in a flourishing state, that of Sarayacu, on the Rio Ucayali, near 7° S. lat., where about 2000 individuals of the tribes of Puinaus, Setebos, Conibos, Shipebos, and Sencis live in scattered houses, and seem to advance, though slowly, in civilization.

Manufactures.—The Peruvian Indians consume a very small quantity of European manufactured articles. Their dress is composed of cotton or woollen stuffs made at home, or in several of the small towns in the vale of the Marañon and Jauja. These home-made stuffs also serve as the dress of the mixed race. Only the creoles dress in European stuffs. There are some manufactures of cordovan leather, and some tanneries and soap-houses. The iron utensils, such as hatchets, scissors, &c., made in Caxamarca, are highly valued. In the large towns many persons are occupied with making vessels, utensils, and ornaments of gold and silver.

Commerce.—The country is too mountainous to admit the making of carriage-roads in the interior. Mules are generally used by travellers and for the transport of merchandise. In the more elevated parts of the country llamas are employed for the latter purpose. Six great roads traverse the country from west to east; the most northern runs from Truxillo to Caxamarca, Chacapoyas, Moyabamba, and Tarapoto. One road leads from Lima to Pasco, another to Tarma, and a third to Huancabelica, Hacamango, and Cuzco. A road leads from Islay to Arequipa and Puno, and another from Arica to Tacna, and thence to La Paz and Oruro in Bolivia. The goods imported from foreign countries are sent by these roads into the interior of Peru.

The foreign commerce is considerable, especially that with the other countries of America bordering on the Pacific, and also with Europe. The most important article of export is the produce of the mines, especially silver. The second in importance is sugar, which is sent to Mexico, New Granada, Ecuador, and Chile. The third article in importance is perhaps saltpetre, the quantity sent to different countries of Europe being very great. Cotton, tobacco, Indian corn, rice, salt, and spirits are minor articles. Wheat, flour, wine, and fruits are imported from Chile, with which country there is an active commerce. Manufactured goods are received from Europe and from the United States of North America, and from Canton silk goods and nankeens.

The principal harbours from which the exports are made, are Payta, Lambayeque, Callao, Pisco, Islay, Arica, and Iquique. We have no recent account of the commerce of the first four harbours, in which probably three-fourths of the exports are shipped. The three last-mentioned harbours are called puertos intermedios, and are usually visited by European vessels which sail along the coast from Valparaiso in Chile to Callao. Nothing is imported into Iquique, the most southern of these harbours, but in 1834 not less than 148,150 cwt. of saltpetre were shipped, of which more than 100,000 was on account of British merchants. The value amounted to 125,000*l.* The number of European vessels which entered the port of Arica in 1834 was 63, and their tonnage amounted to 15,094; there were 17 English vessels, of 3651 tons, 8 French vessels, of 2003 tons, and 10 vessels from the United States of North America, with 2971 tons. The other European vessels were from Antwerp, Hamburg, Cadiz, and Genoa. The vessels from Chile and other parts of Peru were 26 in number. They exported bullion and specie to the amount of 320,301 Spanish dollars, equal to 72,052*l.*; bark to the value of 175,552 dollars, or 39,504*l.*; pewter to the amount of 18,285 dollars, or 4114*l.*; and wool to the amount of 13,252 dollars, or 2982*l.*; chinchilla and vicuña skins, hides, and cotton were among the minor articles of export. In the same year 132 cwt. of copper were brought from the Bolivian part of the valley of the Desaguadero and shipped at Arica. The value of all the exports of Arica does not exceed 150,000*l.* The exports of Islay in the same year amounted to 1,135,590 dollars, equal to 255,507*l.*, viz:—

	Dollars.
Saltpetre	776,000
Silver	124,503
Bark	110,872
Vicuña wool	45,000
Sheep-wool	73,070
Copper	2,500
Rataña	3,645
	1,135,590

The exports of the puertos intermedios, shipped for Europe and the United States, amounted therefore to 530,507*l.*; and as it is assumed that only one-fourth of the commerce of Peru is concentrated in these harbours, the whole exports of the country would exceed 2,000,000*l.*, exclusive of the commerce with Mexico, Central America, and Chile. But it must be remembered that a great part of the exports of the puertos intermedios is brought from Bolivia, as the silver, bark, vicuña and sheep wool, and copper.

History.—When the Spaniards first visited Peru, they found the country under a well-regulated government, and inhabited by a nation which had made great progress in the arts of civilization. The people were decently dressed, and lodged in comfortable houses. Their fields were well cultivated, and artificial cuts had been made to conduct the water of the small rivers to a considerable distance for the purposes of irrigation. They had extensive manufactures of earthenware and woollen and cotton cloth, and also tools made of copper. Even now the elegant forms of their utensils, made out of the hardest rock without the use of iron tools, excite admiration. The extensive ruins of palaces and buildings scattered over the country, and the remains of the great road which led from Quito to Cuzco, and thence southward over the table-land of the valley of the Desaguadero, show that the nation was far advanced in civilization. This civilization appears to have grown up in the nation itself, and not to have been derived from communication with other civilised people. The navigation of the Peruvians was limited to coasting from one small harbour to another in balsas. The difference in political institutions and in the usages of society between the Peruvians and Mexicans precludes the supposition of either of these two nations having received their civilization from the other. Besides this, they were divided by savage tribes, which were sunk in the deepest barbarism. The Spaniards were surprised to find this state of things in Peru. When they had got possession of the country, they inquired into its history, and learned the following traditions:—

About three centuries before the arrival of the Spaniards, Manco Capac and Mama Ocollo appeared on the table-land of the Desaguadero. These two personages, male and female, of majestic stature, appeared clothed in garments, and declared that they were children of the sun, and sent by their parent to reclaim the human race from its misery. The savage tribes submitted to the instruction of these beings of a divine origin, who taught them the first arts of civilization, agriculture, and the manufacture of clothing. Manco Capac organised a regular government, and formed his subjects into four different ranks or classes, which had some slight resemblance to the castes of the Hindus. He also established many useful customs and laws, and founded the town of Cuzco, which soon became the capital of an extensive empire, called the empire of the Incas (or lords) of Peru. He and his successors, being considered as the offspring of the divinity, exercised absolute and uncontrolled authority: disobedience to their orders was considered a sin and violation of the commands of the Supreme Being. His successors gradually extended their authority over the whole of the mountain-region between the equator and 25° S. lat. As the aborigines who inhabit this extensive country speak one language, the Quichua, it must be supposed that they belong to one race, and thus were easily united into one nation, and peaceably submitted to one government. When the Spaniards first entered Peru, the twelfth monarch from the founder of the state, named Huayna Capac, was said to be seated on the throne. He had violated the antient usage of the Incas, which forbade a monarch to marry a woman not a descendant of Manco Capac and Mama Ocollo. His wife was a daughter of the vanquished king of Quito, and the son whom she had borne him, named Atahualpa, was appointed his successor in that kingdom. The rest of his dominions he left to Huascar, his eldest son by a princess of the Inca race. This led to a civil war between the two princes, and when the contest was at its height, a Spanish force entered the country under Francisco Pizarro in 1531.

Pizarro had sailed in 1526 from Panamà to a country lying farther south, which, according to the information collected from the natives, abounded in precious metals. He sailed along the coast as far south as Cape Parina or Cape Aguja. Landing at Tumbez in the Bay of Guayaquil, the most northern point of the present republic of Peru, he was struck with the advanced state of civilization of the inhabitants, and still more with the abundance of gold and silver vessels and utensils. From this time he resolved on the conquest of the country. In 1531 he returned with a small force which he had procured from Spain, marched along the coast, and in 1532 built the town of St. Michael de Piura, the oldest Spanish settlement in Peru. The distracted state of the country caused by the civil war enabled the Spaniards to take possession of it without a battle; and though the Peruvians afterwards tried to renew the contest, they were easily defeated and compelled to submit to a foreign yoke. In many instances during the progress of the conquest (from 1532 to 1534), Pizarro acted with cruelty and perfidy, but he undoubtedly possessed great political sagacity. All the large towns now existing in Peru were built by Pizarro, with the exception of Cuzco, which was founded by Manco Capac. Pizarro built Piura, Truxillo, Lima, Arequipa, and Huamanga.

The disorders which immediately followed the conquest nearly caused the loss of the country, a circumstance which determined the court of Spain to make Peru the chief seat of the Spanish dominions in South America. Lima was chosen for the capital, and it soon rose to such opulence that it was called the City of the Kings. The authority of Spain took deeper root in Peru than in any other of her South American colonies. In 1780 the Peruvians took up arms against the Spaniards, under Tupac Amaro, an Inca, but failing to capture the town of La Paz after a long siege, they again submitted. When all the Spanish colonies began to rise against the mother country, after the year 1810, Peru remained quiet, and though some of the neighbouring provinces had already expelled the Spanish armies, and others were attempting to do the same, the Spaniards remained in undisturbed possession of Peru until 1820, and even then the first impulse to rebellion came from without. General San Martin had collected a force in the provinces of La Plata, with which he entered Chile, and, after a successful war, expelled the Spaniards from that country. In 1820 he came with an army from Valparaiso to Peru, and as soon as he had obtained possession of Lima, the independence of Peru was proclaimed on the 28th of July, 1821, and San Martin was also proclaimed protector of Peru. The Spanish viceroy Canterac, who had remained in possession of the Montaña, gradually recovered the Valles. San Martin, who had lost his popularity, resigned his authority into the hands of the legislature on the 19th of August, 1822. On the 1st of September, Bolivar, the Columbian general, entered Lima, and continued the war with Canterac, but at first with doubtful success. In November, 1823, a constitution proposed by Bolivar was adopted, but the Congress, being unable to maintain its authority, dissolved in February, 1824, and Bolivar was made dictator. After some advantages gained by Bolivar over Canterac, the latter was entirely defeated by Sucre in December, 1824, in the plains of Ayacucho, by which battle the authority of Spain in Peru and South America was annihilated. General Rodil threw himself with 8000 men into the fortress of Callao, which he surrendered, after a siege of more than thirteen months, on the 29th of January, 1826. In February, 1825, Bolivar had resigned the dictatorship, but he had previously contrived to separate the southern provinces from the northern, and to convert the former into a new republic, which adopted the name of Bolivia. The different forms of government which had been tried within the six years following the declaration of independence, were not adapted to the state of society and the circumstances of the nation. Towards the end of 1826, the Bolivian constitution was adopted, according to which a president was to be placed at the head of the government, with the power of naming his successor, and without being subject to any responsibility for his acts. This new constitution excited great discontent, and as Bolivar was soon afterwards obliged to go to Columbia, where an insurrection had broken out and a civil war was on the point of commencing, a complete revolution took place in Peru, in January, 1827. The Bolivian constitution or government was abolished, and a new constitution framed and adopted, which may be considered as still in force. This constitution may be viewed as an attempt to unite a federal republic with a central government. The provincial governments of the departments have the power of framing laws for the provinces, but these laws do not obtain authority till they have been approved by the Congress. The provincial governments however are entitled to the uncontrolled administration of their own affairs, both civil and ecclesiastical. The national congress, or supreme legislature, consists of two bodies, a senate and a house of representatives. The president, in whose hands the executive power is placed, is chosen for four years, and he cannot be re-elected. He is assisted in the administration of the public affairs by a ministry of his choice, and by a state council, which is elected by the legislature. The judicial power is independent of the executive, and all decrees and judgments are to be made public. The highest officers of the central government in the departments are the prefects and subprefects. These persons, as well as the judges, are elected by the Congress from three candidates, who are proposed by the provincial governments. The Roman Catholic religion alone can be publicly exercised. Peru has experienced, even more than the other parts of America which once were subject to Spain, the bad effects of having adopted a constitution unsuited to the state of society. The country is almost continually distracted by parties which are struggling for power, and by civil wars and revolutions produced by these continual struggles. In 1835 four chiefs in arms were contending for supremacy. If one of them succeeded in making himself powerful, the others united against him; but no sooner were they victorious, than they were again disunited and in hostility to each other. In 1836 the four southern departments, Cuzco, Ayacucho, Puno, and Arequipa, separated from the four northern, and constituted an independent state, under the name of Estado Sud Peruano. We do not know whether the two parts of Peru have again united under one government, or continue to form two republics.

(Ulloa's *Voyage to South America*; Humboldt's *Personal Narrative*, &c.; *Memoirs of General Miller*; Meyen's *Reise um die Welt*; Poeppig's *Reise in Chile, Peru, &c.*; Smyth's and Lowe's *Narrative of a Journey from Lima to Para*; *Narrative of the Surveying Voyages of the Adventure and Beagle*; Pentland, in the *London Geographical Journal*, vols. v. and viii.; Miller, in the *London Geographical Journal*, vol. vi.)

PERUVIAN ARCHITECTURE. Remains of antient Peruvian buildings are dispersed over the western parts of South America, from the equator to 15° S. lat., especially over the Montaña. They are characterised by simplicity, symmetry, and solidity. There are no columns, pilasters, or arches, and the buildings exhibit a singular uniformity and a complete want of all exterior ornaments.

The great road of the Incas, which runs from Quito to Cuzco and the table-land of the Desaguadero, is made of enormous masses of porphyry, and it is still nearly perfect in several parts of the Montaña. Humboldt obtained an antient Peruvian cutting instrument, which had been found in a mine not far from Cuzco: the material consisted of 94 parts of copper and 6 of tin, a composition which rendered it hard enough to be used nearly like steel. With instruments made of this material the Peruvians cut the enormous masses of which their buildings are composed. Some of the buildings near Cuzco contain stones 40 feet long, 20 feet wide, and nearly 7 feet thick. These stones are fitted together with great skill, and, as it was supposed, without cement. But Humboldt discovered in some ruins a thin layer of cement, consisting of gravel and an argillaceous earth; in other edifices, he says, it is composed of bitumen.

The stones are all parallelopipedons, and worked with such exactness that it would be impossible to perceive the joinings if their exterior surface were quite level; but being a little convex, the junctures form slight depressions, which constitute the only exterior ornament of the buildings. The doors of the buildings are from 7 to 8¼ feet high. The sides of the doors are not parallel, but approach each other towards the top, a circumstance which gives to the Peruvian doorways a resemblance to those in some of the Egyptian temples. The niches, of which several occur in the inner side of the walls, have the form of the doors.

The most extensive Peruvian buildings occur in the table-land of Cuzco, which was the most antient seat of the monarchy of the Incas. There are also antient remains within the boundaries of the present republic of Ecuador. Near the ridge called Chisinche, not far from the volcano Cotopaxi, are the ruins of a large building called the Palace of the Incas. It was a square, of which each side is about 30 yards long, and it had four doors. The interior was divided into eight apartments, three of which are still in tolerable preservation. Not far from the mountain-pass of Assuay is a building called Ingappilca, or the Fortress of Cañar, consisting of a wall of very large stones, about 5 or 6 yards high; it has a regular oval form, of which the greatest axis is nearly 40 feet long. In the ruins of the town of Chulucanas, in the department of Truxillo, near the boundary-line between Peru and Ecuador, Humboldt had an opportunity of observing the construction of the private buildings of the Peruvians, and he observes that they consist of one room only, and that probably the door opened into a court-yard. (Humboldt's *Vues des Cordillères et Monuments des Peuples Indigènes, &c.*)

PERU'GIA, DELEGAZIO'NE DI, a province of the

Papal State, is bounded on the north by the central ridge of the Apennines, which separates it from the province of Pesaro e Urbino, on the west by Tuscany, on the south by the provinces of Spoleto and Viterbo, and on the east by the provinces of Macerata and Spoleto. Its length from the Apennines, which border the valley of the Tiber above Città di Castello, down to the confluence of the Paglia with the Tiber, is about 60 miles, and its breadth varies from 20 to 35 miles. The area is reckoned at about 1790 square miles. The province of Perugia is entirely in the basin of the Tiber. The lake of Perugia (Lacus Trasimenus) lies in the territory of Perugia, near the borders of Tuscany; its circumference is about 30 miles, the greatest width is about eight miles, but the depth is not more than 30 feet. It contains three small islands; two (of which one is called Isola Maggiore) are towards the north, and the third (called Polrese) towards the southern extremity. This lake is enclosed by hills on the north, east, and south, but the western coast is more open, merging into the wide plain of Cortona. This lake is fed by no permanent river, but by numerous springs which rise from the bottom of the bed; it has no natural outlet, and in seasons of rain, when numerous streams run into it from the neighbouring hills, it suddenly overflows the banks, and sometime the waters have entered the plain of Cortona, and mixing with those of the Chiana, have flowed into the Arno. In order to prevent the mischief occasioned by these floods, a tunnel or emissary has been made through a hill on the south-east bank near the parish church of San Savino, opposite the island of Polrese. The mouth of the emissary is about six feet high and five wide, and the length is 2845 feet; it is entirely cased with masonry. Seven shafts open into it from the sides of the hill at various distances along the length of the tunnel, and give access to the workmen for clearing and repairing it. The water on issuing out of the tunnel flows into a canal, sets in motion several mills, and after a course of about two miles enters the river Caïna, an affluent of the Nestore, which is an affluent of the Tiber. The mouth of the emissary is above the ordinary or summer level, and the water flows into it only in the winter or after heavy rains. (Vestrini, 'Dissertazione sull' Emissario del Lago di Perugia,' in vol. vii. of the *Memoirs of the Academia Etrusca di Cortona.*) The construction of this important work is due to Braccio da Montone, a distinguished chieftain, and lord of Perugia in the beginning of the fifteenth century. Some pretend that the emissary existed long before, and was only repaired by Braccio, but there is no evidence in support of this assertion. The emissary became encumbered in course of time, and a great flood occurring in 1602, the waters of the lake inundated the plain of Cortona, and did great mischief in other places along the banks. After this misfortune, Pope Clement VIII. ordered the emissary to be repaired. Campanus, 'De Rebus Gestis Andreæ Brachii,' 6th book, gives a pleasing description of the lake of Perugia, its wide expanse, its limpid waters, its verdant and picturesque green banks, and the towns and villages scattered along the shore. Seen from the hills of Spelonca, between Ossaia and Passignano, on the high road from Florence to Perugia, the lake has a very fine appearance. This lake is subject to sudden storms.

The site of the battle between Hannibal and the Romans has been a subject of much contention among the learned. It is generally supposed to be near Passignano on the north-east side of the lake, where the hills recede from the shore, forming a kind of valley or dale between them and the lake. The province of Perugia is chiefly hilly, being crossed by offsets from the Apennine chain, which stretch southwards in a direction parallel to the course of the Tiber. South of the town of Perugia are some extensive plains, one of which lies eastwards towards Foligno, and another on the western or right bank of the Tiber, towards Città della Pieve. The principal affluents of the Tiber in the province of Perugia are—1, the Chiascio, which rises in the central Apennine ridge, and flowing southwards receives the Topino, which comes from the valley of Foligno, after which the united stream enters the Tiber a few miles below Perugia; 2, the Nestore, which rises near Città della Pieve, flows south of the hills which border the southern bank of the lake of Perugia, receives the Caïna from the north, and after a course of about 35 miles enters the Tiber; 3, the Naja, a torrent which rises in an offset of the Apennines that separates the valley of the lower Nera, or of Terni, from that of the Tiber, and runs into the Tiber below the town of Todi, after a course of about 20 miles; 4, the Chiana, which is the outlet of the lake of Chiusi in Tuscany, drains the southern part of the Val di Chiana, receives the river Astrone on its right bank and the Tresa on its left, and entering the Papal territory near Città della Pieve, joins the Paglia at Orvieto, a few miles below which the united stream enters the Tiber.

The province of Perugia is the fourth in extent in the Papal State, being inferior only to those of Rome, Viterbo, and Spoleto e Rieti. It is the most fertile of the provinces south of the Apennines. The principal productions are corn, wine, oil, silk, and grass, on which large herds of fine horned cattle are fed: nearly one-half of the consumption of butcher's meat by the city of Rome is supplied by cattle from Perugia. The lake of Perugia abounds with fish, which forms a considerable article of export; and the shores are frequented by numerous aquatic birds. The climate is healthy, except in a few low spots on the banks of the lake and in the valley of the Chiana near Città della Pieve.

The principal towns of the province are—1, **Perugia**; 2, **Assisi**; 3, **Nocera**; 4, Foligno, a pleasant well-built town in a delightful valley on the river Topino, a short distance above its confluence with the Maroggia or Timia, which comes from Spoleto. Foligno is said to have been built about the eleventh century, being first inhabited by colonists from the antient town of Forum Flaminii, which was in the neighbourhood. It has a handsome cathedral, several other fine churches, and manufactures of woollens, silks, extensive paper-mills, and 7300 inhabitants. Foligno is one of the most trading inland towns in the Papal State. It suffered considerably from the earthquake of 1832. 5, Todi, the antient Tudertum, a city first of the Umbri, next of the Etruscans, and afterwards a Roman colony, stands on a hill above the Tiber. It has a cathedral and another handsome church built after the design of Bramante, with several remains of Etruscan and Roman antiquities, among which are the town walls and the ruins of a temple of Mars. The population of Todi is 2500. 6, Città di Castello, a well-built town, with 5000 inhabitants, in the valley of the Upper Tiber, near the borders of Tuscany, contains several fine churches, some good paintings, and the palace of the former baronial family of Vitelli, known in the history of the middle ages. It has a wooden bridge over the Tiber. 7, Città della Pieve, a small town situated on an eminence above the Chiana, has about 2000 inhabitants. Remains of antiquity have been dug up in the neighbourhood. (Brasavola, *Breve Ragguaglio della Città di Pieve*, folio, Perugia, 1686.) 8, Marsciano, a walled town in the valley of the Nestore, has about 2000 inhabitants, and a fertile territory. 9, Fratta, on the left or eastern bank of the Tiber, 14 miles north of Perugia, has some good buildings, a theatre, and a bridge on the river; the population, including its territory, is 4700. The inhabitants manufacture pottery, which they paint with considerable taste. 10, Castiglione del Lago, on the western bank of the lake of Perugia, has some good buildings, and about 5300 inhabitants, including the territory of the commune. 11, Gualdo, at the foot of the Apennines, 8 miles north of Nocera, is near the site of the antient town of Tadinum, long since ruined, near which Totila was defeated and wounded by Narses: it has about 4000 inhabitants. 12, Spello, a few miles north of Foligno, is on the site of the antient Hispellum, of which there are still considerable remains; among others, a triumphal arch in honour of the emperor Macrinus. Spello has several churches, with good paintings, a college, and about 2400 inhabitants. (Calindri, *Saggio geografico-statistico dello Stato Pontificio.*)

The province of Perugia is divided for administrative purposes into four districts, Perugia, Città di Castello, Foligno, and Todi, containing altogether 202,600 inhabitants (Serristori, *Statistica d'Italia*), and is one of the most interesting provinces of the Papal State, though little noticed by strangers.

PERUGIA, THE TOWN OF, built on a high hill which forms two summits, and rises on the left or western bank of the Tiber, is surrounded by walls in the form of a polygon. The streets are wide, and the squares are lined by massive old buildings. It has also numerous churches with lofty domes, fine gates, and retains all the appearance of an important though now somewhat decayed city. Perugia is a bishop's see, and it has a long-established university, which reckons among its early professors Bartolo and Baldo. The university is now attended by between

300 and 400 students: it has a library of 30,000 volumes, with some valuable MSS., among others a Stephanus Byzantinus, a botanical garden, a collection of minerals, and a cabinet of antiquities rich in Etruscan inscriptions, bronzes, vases, and medals. The academy of the fine arts has a collection of paintings by natives of Perugia and of the territory. Several noblemen have also galleries of paintings in their palaces, such as the Marquis Monaldi, Baron della Penna, Count Staffa, Oddi, &c. Perugia has a school of music, two theatres, a dramatic academy, a casino, or assembly-rooms of the nobility, and a literary cabinet or club. Perugia has long been distinguished among the provincial towns of the Papal State for its love of learning. A biographical list of authors natives of Perugia has been commenced by Professor Vermiglioli, 'Biographia degli Scrittori Perugini,' but not completed. Vermiglioli has also published a catalogue of writers who have illustrated the history of his native city: 'Biblioteca Storica Perugina,' 4to., Perugia, 1823. Oldoni has written 'Athenæum Augustum in quo Perusinorum Scripta publice exponuntur,' 1678. Passeri has written the lives of the native artists: 'Vite dei Pittori, Scultori, ed Architetti Perugini,' 4to., 1732. Brandolesi has given an account of the works published at Perugia in the first century of the invention of printing: 'La Tipographia Perugina del Secolo XV. illustrata,' 8vo., 1807. Vermiglioli has written on the mint of Perugia: 'Memorie della Zecca e delle Moneti Perugine,' 8vo., 1816. The antiquities of Perugia, both Etruscan and Roman, have been illustrated by Orsini, Vermiglioli, and Bianchini; and the modern works of art by Mariotti and Morelli, 'Pitture e Sculture della Città di Perugia,' 1683, besides the common guide-books. Among the contemporary learned men of Perugia, the antiquarian Vermiglioli, Mezzanotte (the translator of Pindar and professor of Greek literature), Canali (professor of physics and rector of the university), Colizzi (professor of law), and Antinori (a poet and professor of Italian literature), deserve notice. Perugia has produced two burlesque poets, Coppetta and Caporali, the latter of whom is considered by many as equal to Berni.

The population of Perugia, including the suburbs, is 15,000 (Calindri); in the time of its independence, in the sixteenth century, the population was reckoned at 40,000. The circumference of the walls is above six miles, but much of the area within is open and unbuilt upon. The citadel, from which there is a splendid view, extending on one side along the valley of the Tiber, and on the other over the basin of the lake, the plains beyond it, and the long chain of the Apennines, was built by Pope Paul III., to keep the city in awe, and it occupies a considerable space. Perugia has some manufactories of silks, woollens, and soap, but the principal trade consists in the products of its fertile territory, corn, oil, wool, and cattle.

Among the many churches of Perugia, said to be above one hundred, the most remarkable are—1, the Duomo, or cathedral, in the Gothic style, with some good paintings by Signorelli, Baroccio, and others. A painting by Perugino, representing the marriage of the Virgin, which adorned this church, was taken away at the first invasion of Bonaparte, and it is not known what has become of it. The number of masterpieces of paintings taken from Perugia by the French amounts to about thirty. Some were restored at the peace, but it seems that, instead of returning to Perugia, they have been placed in the Vatican gallery at Rome. 2, The church of S. Francesco was plundered of the 'Descent from the Cross,' by Raphael, at an earlier date, by Paul V., and this picture is now in the Borghese Gallery. 3, The vast Benedictine convent of S. Pietro, one of the wealthiest in the Papal State, has several paintings by Vasari. 4, The church of S. Domenico has a fine coloured-glass window in the choir, and the tomb of Pope Benedict XI., who died at Perugia in 1304, is remarkable for its sculptures. Descriptions of each of these churches are published.

The town-house, 'Palazzo dei Priori,' a vast Gothic building, and the residence of the delegate and of the municipal authorities, contains the archives of Perugia, among which are some curious documents of the middle ages. The old exchange, 'Sala del Cambio,' is adorned with beautiful frescoes by Perugino. The square before the cathedral contains a beautiful fountain, with sculptures by Giovanni da Pisa. In the square 'Del Papa' is the bronze statue of Julius III. seated in a chair, cast by Vincenzo Danti of Perugia. The Place Grimana has a handsome gate, said to be of Etruscan construction, but called the arch of Augustus. The church S. Angelo is built on the site and with the materials of an antient temple. For the Etruscan remains at Perugia, see Etruria (*Antiquities*).

Some interesting excavations are now going on at Perugia, and many objects of antiquity have just been discovered in the immediate vicinity of the city while making a new road. (*Communication from Perugia*, Jan., 1840.)

Perusia was one of the principal cities of antient Etruria, but it seems to have been built before the Etruscan dominion by a colony of Umbri from Sarsina. (Servius, x. 201.) In an Etruscan inscription in the Museum Oddi it is called Perusei. Perusia acted a principal part in the wars of the Etruscans against Rome; its troops were defeated by the consul L. Fabius Maximus, and then Perusia, together with Arretium, sued for peace, and paid tribute to Rome, 294 B.C. (Livy, x. 31, 37.) In the second Punic war, Perusia was one of the allied towns that sent timber and provisions to Scipio to fit out his armament against Africa. During the second triumvirate, the consul Lucius Antonius, brother of Marcus the Triumvir, stimulated by Fulvia, his sister-in-law, having quarrelled with Octavian, and being defeated, shut himself up in the town of Perusia, where he sustained a long siege, and at last, through famine, was obliged to surrender to Octavian, who put to death 300 of the principal citizens of Perusia, and gave up the town to plunder. Perusia was on that occasion nearly destroyed by fire. It was afterwards rebuilt under the name of Perusia Augusta. At the fall of the Western Empire, it was devastated by the Goths under Totila. It passed afterwards through the same vicissitudes as most other towns of Italy: it ruled itself for a time as a free municipality, had its factions of Guelphs and Guibelines, its own tyrants, and at last submitted voluntarily to the rule of Braccio da Montone, one of the best and wisest chieftains of the middle ages. After his death, the government passed through the hands of several of his relatives, and from them to that of the family of Baglioni. Giovani Paolo Baglioni, being seized at Rome by Pope Leo X., was beheaded on some political charge. His descendants however governed Perugia for some years after, until Pope Paul III. united it to the Papal State and built the citadel. (Ciatti, *Memorie di Perugia;* Mariotti, *Saggio di Memorie Istoriche della Città di Perugia.*)

Twelve miles north of Perugia, in a romantic situation among the Apennines, is the monastery of Monte Corona, belonging to the order of Camaldoli, the monks of which have cultivated and planted with trees the surrounding territory. This monastery was one of the few that was spared by the French during their occupation of the Papal State. The monks have an hospice at the foot of the mountain for the reception of travellers. (Premuda, *La Istoria Romoaldina, ovvero Eremitica di Monte Corona*, Venice, 1590.)

PERUGI'NO, PIETRO, or PIETRO VANNUCCI DELLA PIEVE, 'DE CASTRO PLEBIS,' was the son of a certain Cristofano, a poor man of Castello della Pieve, where Pietro was born, in the year 1446. His father is said to have placed him as a shop-boy (fattorino) with a painter of Perugia. When about twenty-five years of age he visited Florence, and, according to Vasari, became a pupil of Andrea Verocchio, the master of Lorenzo di Credi and Leonardo da Vinci; but this fact seems very doubtful. In the course of a few years he attained considerable reputation, and his works were so much esteemed as to be exported. In 1475 we find him employed by the magistrates of Perugia, and the order for a payment to him in that year appears on the public records of the town. In 1480 he executed some frescoes for Sixtus IV. in the Sistine chapel at Rome: only one or two of these now remain, the greater part having been destroyed to make room for the Last Judgment of M. Angelo in the time of Paul III. The Dead Christ, and other figures so much praised by Vasari, were painted for the nuns of Santa Chiara at Florence in 1485. Francesco del Pugliese is said to have bid for this picture three times the original price, and a duplicate by Perugino, but the offer was refused. In the year 1500 Pietro executed the frescoes in the Cambio at Perugia. He afterwards visited Florence again, but, in consequence of a quarrel with the artists there, returned to the city whence he derives his name. He died at Castello della Pieve, in 1524.

The fame of Perugino has certainly been widely spread, from the circumstance of his having been the teacher of Raphael; but, at the same time, the superior genius of the pupil has thrown into comparative obscurity the real merit of the master. Perugino was a most unequal painter: his early works are far better than those executed after 1500. The popularity of his pictures, and the facility which he had acquired, produced repetition and mechanical execution. Vasari says 'he gave all his figures one and the same air;' it must however be admitted that that 'air' is far superior to the contortions of Vasari himself and his fellow-pupils in the school of M. Angelo. Perugino lived to see the conflict between the old and simple style and the very different principles of the great master just named. With M. Angelo himself he is reported to have had a public quarrel: Vasari's account therefore of his moral character must be received with some little suspicion. He says that Perugino was an infidel, who could never be brought to believe in the immortality of the soul, and who would do anything for money. At the same time he gives him great credit for his technical skill, especially in colouring.

Among the best pictures of Perugino now extant are:—An Infant Christ, Virgin, and Angels, painted in 1480, and preserved in the Albani Palace at Rome; a Fresco in Santa M. Maddalena dei Pazzi at Florence, executed at a later period; the Dead Christ, before alluded to (now in the Pitti Palace, No. 164); one or two pictures in the Accademia at Florence; and his frescoes in the Cambio at Perugia. Mr. Beckford, in this country, possesses a work of Perugino's best time.

Raphael was a pupil of Perugino, and his early works, such as the Marriage of the Virgin, greatly resemble those of his master. [RAPHAEL.]

The following painters were among the most eminent scholars of Perugino:—Pinturicchio of Perugia; Andrea Luigi d'Ascesi, called l'Ingegno; Giovanni Spagnuolo, surnamed Lo Spagna; and Rocco Zoppo of Florence.

(Vasari, *Vite dei Pittori;* Rumohr, *Italienische Forschungen;* Lanzi, *Storia Pittorica.*)

PERU'SIA. [PERUGIA.]

PERUVIAN ARCHITECTURE. [PERU.]

PERUVIAN BARK. [CINCHONA.]

PERUZZI, BALDASSA'RE, an architect of less celebrity than many greatly inferior to him in design, was born in 1481, at Volterra, to which city his father Antonio had removed, in order to avoid the civil dissensions which agitated Florence. A few years afterwards Volterra itself was besieged and sacked, and Antonio fled to Siena, where the family lived in reduced circumstances, having lost nearly all their property. On his father's death, Baldassare, who had enjoyed opportunities of access to many artists and their works, determined to apply himself to painting, which he did with so much assiduity, both from his natural inclination and from his wish to aid his mother and sister, that he made extraordinary progress. After executing some subjects in a chapel at Volterra, he accompanied a painter of that city, named Piero, to Rome, where the latter was employed by Alexander VI. The death of that pope frustrated their scheme of working in concert at the Vatican; however Baldassare remained for awhile at Rome, where he painted some frescoes in the church of S. Onofrio, and in that of San Rocco à Ripa, and distinguished himself by some others at Ostia, particularly by one in chiaro-scuro, representing a siege by Roman warriors, and remarkable for the strict fidelity of the antient military costume, which he derived from bas-reliefs and other existing monuments.

On returning to Rome he found a liberal patron in the celebrated Agostino Chigi (a native of Siena), by whom he was enabled to continue at Rome for the purpose of devoting himself chiefly to the study of architecture. The acquirements he thus made soon displayed themselves in what was then quite a new career of art, namely architectural perspectives and scene-painting; and the science of perspective and its application to pictorial illusion and effect. To what perfection he brought this branch of art may be judged from what Vasari relates, who says that on his taking Titian to see some of Peruzzi's works, that great painter could hardly believe at first that the objects were not real. Of his astonishing performances in scene painting there is now no evidence, but some idea of his extraordinary ability in it may still be formed from the painted architecture, &c. with which he decorated a gallery in the Farnesina. It was not however in scenic and fictitious architecture alone that he displayed his talent for that art; he designed many elegant façades at Rome, and gave proof of his superior ability in the Palazzo Massimi, one of the most original and tasteful edifices of its class in that city. Instead of being perplexed by the awkwardness of the site, he availed himself of it to curve the front of the building, and thereby produce so happy an effect that such form seems to have been entirely the result of choice, and independent of other circumstances. The loggia and small inner court are singularly beautiful, and the whole edifice deserves the attention it has received in a folio work, by Suys and Haudebourt, expressly devoted to it, and containing outline engravings of all its parts and details (Paris, 1818).

Peruzzi made a design for St. Peter's on the plan of a Greek cross, which, had it been executed, would have surpassed the present structure; also two different designs for the façade of S. Petronio at Bologna. On Rome being taken and sacked by the Constable Bourbon, it was with extreme difficulty that Baldassare escaped from the hands of the soldiery, and after being pillaged of everything, reached Siena, where he was most kindly received, and employed on various buildings. He returned however to Rome, and it was then that he built the Palazzo Massimi, but did not live to see it quite completed. He died in 1536, not without suspicion of having been poisoned by a rival who sought to obtain the appointment which he held as architect of St. Peter's. He was buried in the Pantheon, near Raphael.

PE'SARO E URBI'NO, LEGAZIONE DI, a province of the Papal State, is bounded on the east by the province of Ancona, on the north and north-east by the Adriatic Sea, on the west by the province of Forli and the grand-duchy of Tuscany, and on the south by the province of Perugia. The area is estimated at 1749 square miles. (Neigebaur.) The central ridge of the Apennines, which divides the province of Pesaro e Urbino from Tuscany, projects eastward towards the Adriatic in the neighbourhood of Urbino, and sends off several offsets, which run to the sea-coast, forming the natural boundary between Northern and Southern Italy. The mountain on which San Marino stands forms part of one of these offsets. [SAN MARINO.] Several streams run in a north-east direction from the Apennines to the sea. The first of these streams, reckoning from the north, is the Conca, which runs along the boundary between the province of Forli and that of Pesaro, and after a course of about twenty-five miles enters the sea near La Cattolica. The next is the Foglia, the antient Pisaurus, which rises in the Apennines of Carpegna on the Tuscan border, and after a course of forty-six miles enters the sea at the town of Pesaro. Farther south is the Metauro, the largest river in the province, which rises near Borgo Pace on the east side of the Apennines that bound the valley of the upper Tiber: it runs first due east, passing by the towns of St. Angelo and Urbania, receives the united stream of the Cantiano and Candigliano, which comes from the south from the mountains of Gubbio, then turning to the north-east passes by Fossombrone, and enters the sea by the town of Fano, after a course of nearly sixty miles. According to a tradition among the country-people, the spot in which Hasdrubal was defeated and killed is a plain called Piano di San Silvestro, above the confluence of the Cantiano, and about six miles south of the town of Urbino. A tower on a hill called Monte d'Elce, on the right bank of the Metaurus, is called the sepulchre of Hasdrubal. The Flaminian road from Fano crosses the Metaurus above Fossombrone, and follows the course of the Cantiano, ascending the Apennines above the source of the latter river, and afterwards descending by Gualdo to Nocera. The next river in the province of Pesaro is the Césano, which rises in the mountains of Avellana, passes the town of Pérgola and the site of the antient town of Suasa, of which some remains are still visible, and enters the sea north-west of Sinigaglia, after a course of about thirty miles. South-east of the Césano is the Misa, which enters the sea at Sinigaglia, after a course of about twenty-five miles.

The surface of the province of Pesaro e Urbino is hilly; some parts of it are very fertile, but the mountains are generally barren. The lower hills are planted with vines, olive, and mulberry-trees. Good pasture is also abundant. The province is divided into five districts—Urbino, Pesaro, Fano, Sinigaglia, and Gubbio, containing altogether 226,000 inhabitants. (Serristori.) The principal towns are—URBINO, which is the old capital of the province and the residence of the former dukes. 2. Pésaro, the antient Pisaurum, a well-built town and a bishop's see, has several fine churches with some good paintings, a fine market-place, several palaces of the nobility, and the palace of the former dukes della Rovere, who were once sovereigns of this little state, a public library of 15,000 volumes, with a museum and a cabinet of models bequeathed by Olivieri, a learned man of Pesaro, to his townsmen. Pesaro has a small harbour, several manufactories of silks, pottery and glass, and leather, and about 11,000 inhabitants. (Calindri.) The surrounding territory, which is very fruitful, produces, among other things, excellent figs, and is covered with pleasant country-houses. Pesaro carries on a considerable trade in the agricultural products of the province. A bed of coal has been discovered in the neighbourhood. Pesaro has a civil and criminal court, and a commercial tribunal, a college, and a clerical seminary. It is the birth-place of Pandolfo Collenuccio, a chronicler and poet of the fifteenth century; of Count Perticari, a philologist and son-in-law of Monti; and of the musical composer Rossini. 3. Fano, the antient Fanum Fortunæ, is a town with about 7000 inhabitants. It has a triumphal arch dedicated to Augustus, which has been badly restored, and therefore spoiled (Poletti, *Ragionamento intorno all' Arco d'Augusto in Fano*), several churches with paintings by Guido and Guercino, a handsome theatre, some silk manufactories, and a public library. On the coast near Fano are taken great quantities of a small fish called 'cavallo marino,' the head of which resembles that of a horse, and has a sort of mane attached to it. 4. Sinigaglia, the antient Sena Gallica, is a bustling town with a small harbour, several churches and convents, and about 8000 inhabitants. It is chiefly remarkable on account of its great fair, one of the largest in Italy, which is held in the month of July, and is frequented by tradespeople from all parts of Italy, and also from other countries. About 200 vessels, mostly of small burthen, of the various nations which trade in the Mediterranean, arrive at Sinigaglia at that time, and bring colonial and other produce, and also French, English, and German manufactures. The celebrated singer Madame Catalani, was a native of Sinigaglia. 5. Fossombrone, situated on a hill about a mile and a half from the ruins of Forum Sempronii, which are lower down the banks of the Metaurus, is a bishop's see, has several churches and convents, a bridge on the Metaurus, and about 4000 inhabitants. The silk spun at Fossombrone is considered the best in Italy. 6. Gubbio, the antient Iguvium, a city of the Umbri, is situated out of the high road on the southern slope of the Apennines near the sources of the Chiascio, an affluent of the Tiber: it has several churches and other buildings worthy of notice, and about 4500 inhabitants. Old Iguvium was in a lower situation than the present town; the amphitheatre is still in tolerable preservation; eighteen of the lower arches are remaining, as well as three of the upper row. There is also an antient tomb, with other remains of antiquity. No traces of the temple of Jupiter Apenninus, an old deity of the Umbri, are visible at Gubbio, but according to Micali, they are to be seen three miles from Chiascerna, the antient Clavernium, not far from the post station of La Scheggia in the Apennines, on the high road called the Furlo. In this neighbourhood also were found, about the middle of the fifteenth century, the seven bronze tablets written partly in Etruscan and partly in Latin characters, and known by the name of the Eugubine tables, which are now in the museum of Gubbio. According to the interpretation of Lanzi, they relate entirely to the religious rites of the antient Umbri. 7. Cagli, the antient Callis, a Roman colony, on the Flaminian road, has about 3000 inhabitants, and some remains of antiquity. 8. Urbania, a modern town, which derives its name from pope Urban VIII., is situated on the banks of the Metaurus, has a collegiate church, a manufactory of majolica, or Delft ware, and about 4400 inhabitants. 9. Pérgola, on the Césano, has 2500 inhabitants. [Calindri.]

The province of Pesaro e Urbino is very interesting for its romantic scenery, its classical recollections, and the numerous remains of antiquity which are scattered about it.

PESCE, NICOLA, or COLA, a famous Sicilian swimmer and diver, who lived towards the end of the fourteenth century. His name was Nicholas, and he was surnamed 'Pesce' (the fish) on account of his expertness in diving. Frederic II., king of the Two Sicilies, employed him, and encouraged his feats. The most incredible stories are told of him; it is said that he passed whole hours under water, and whole days in the water; that he used to swim from Sicily to the Lipari Islands, carrying letters and despatches in a leathern bag, &c. The truth seems to be that he was a most expert swimmer and diver, and that he could remain longer under water than any other person on record. He had been accustomed from his boyhood to dive for oysters and coral along the coast of his native country. It is reported that king Frederic once asked him to dive into the sea off the Point of Faro, where the current forms a whirlpool known by the name of Charybdis; and as Pesce hesitated, the king threw a golden cup into the sea, when Pesce plunged in, and after remaining a considerable time under water, brought up the cup, to which the king added a purse of gold as a gift. Pesce was induced to repeat the experiment, but he never rose again from the sea. (Kircher, *Mundus Subterraneus*, b. i.) We know now that the whirlpool of Charybdis is not so fearful as it was once represented to be, and that at times there is very little agitation in the water.

Mariotti, in his 'Riflessioni' on the lake of Perugia, speaks of a fisherman called Nonno di San Feliciano, who was 'a great swimmer and diver, like Pesce Cola of Sicily and lived almost entirely in the water. He lived till past ninety years of age.' It must be observed however that the lake of Perugia is not very deep.

PESHAWER. [AFGHANISTAN.]

PESTH, the greatest commercial town and the most populous city in Hungary, is situated in 47° 30′ N. lat. and 19° 4′ E. long., on the left or east bank of the Danube, about 20 miles from the spot where the course of the river, till then nearly from west to east, makes a sudden bend to the south. On the other side of the Danube, which is here about 1500 feet broad, is the city of Ofen. [BUDA.] The two cities are connected by a bridge of boats, which, including the fixed portion on the two banks, is 1500 paces in length. The city of Pesth is about seven miles in circumference. It consists of five principal parts—1, the old town, which, though antiquated and irregularly built, contains some fine buildings; 2, the Leopoldstadt, or new town; 3, the Theresienstadt; 4, the Josephstadt; and 5, the Franzstadt—so named after the sovereigns in whose reigns they were built. Leopoldstadt is now joined to the old town, the walls which formerly surrounded the latter having been levelled to make room for new buildings. Leopoldstadt is built on a very regular plan. The other three parts or suburbs are separated from these two by a very broad street. Among the fifteen churches, that of the university is distinguished by its fine steeple and excellent fresco paintings. The other Roman Catholic churches, 11 in number, are not remarkable; but the Greek church on the Danube is one of the finest buildings in the city. The two Protestant churches are very plain edifices. Of the other public buildings, the following deserve notice: the great barracks built by Charles VI.; the hospital of invalids, an immense edifice begun in 1786 under Joseph II., the building of which was interrupted by the Turkish war (it is not known to what use it was destined by that emperor; at present it serves as barracks for a regiment of artillery); the theatre, a very handsome edifice, capable of containing 3000 spectators; the national museum, and the university. The university was founded in 1635 at Tyrnau. In the seventeenth and eighteenth centuries it exercised, through the powerful agency of the Jesuits, great influence over the people. In the year 1777 it was transferred by Maria Theresa to Ofen, and in 1784 by Joseph II. to Pesth. The branches of learning taught are theology, law, medicine, philosophy, philology, and mathematics. There are 49 professors and above 1000 students. The university has a library of 60,000 volumes, a cabinet of natural history, a collection of medals, a chemical laboratory, and an anatomical and pathological collection. Dependent on it are the botanic garden, the veterinary school, the university hospital, and the observatory at Ofen, which stands on the Blocksberg, 278 feet above the Danube, and is well furnished with good instruments. The National Museum, which is independent of the university, was founded by Count Szecsenyi, who gave his fine library and a valuable collection of Hungarian coins and medals, and induced the Diet in 1808 to endow it. It would take a volume to describe this museum. The collection of coins and medals contains above 60,000 specimens, of which the Greek, Roman, and other antique silver medals amount to above 12,000. The gymnasium of the Piarists has 800 scholars; and the city normal school (likewise in the convent of the Piarists), above 400. There are eight other Catholic schools, two Greek, and two Protestant schools. The Roman Catholic girls' school of the English ladies, as it is called, has 400 day-scholars and 40 boarders.

Though Buda is the residence of the viceroy and the capital of the kingdom, Pesth is the seat of the high court of justice, and of the supreme court of appeal and other tribunals, and also of the government of the three united counties of Pesth, Pils, and Solther, which contains a population of 400,000 inhabitants. The manufactures are of silk, cotton, leather, jewellery, and musical instruments, but on a small scale; that of tobacco is a government monopoly. Pesth however has, next to Vienna, the greatest trade of any city on the Danube. It has four fairs, each of which lasts a fortnight. The principal articles sold are manufactures and colonial produce, and the natural productions of the country, such as cattle, wine, wool, tobacco, and raw hides, honey, wax, &c. Above 14,000 waggons and 8000 ships are employed in conveying goods to and from the fairs, the value of which at each of them is from 16 to 17 millions of florins. The environs of Pesth are not picturesque, the city being situated on a sandy plain, but there are some fine promenades, such as the Grove, a mile and a half from the city; the gardens of Baron Orczy; and the Palatine, or Margaret Island, in the Danube, which is laid out in walks and gardens with great taste. Among the inhabitants are many noblemen, country gentlemen, professors, judges, and lawyers. The population of Pesth consisted (1833) of 62,850 inhabitants, of whom about 54,000 were Roman Catholics, 3000 Protestants, 817 Greeks, and 5000 Jews. With the addition of the garrison (9133 men) and the numerous strangers, the population amounts to 75,000. Pesth, though an antient town, is in its present form comparatively recent. It has been frequently laid waste by war, and was in the possession of the Turks for nearly 160 years, who were not finally expelled till 1686. Civil war followed, and at the beginning of the eighteenth century Pesth was one of the most inconsiderable towns in the kingdom. Its improvement may be dated from the reign of Maria Theresa, and it has since been progressive and rapid. In 1793 there were only 2580 houses: there were in 1837, 4500. The winter of 1838 was disastrous to Pesth, above 1200 houses being destroyed by the overflowing of the Danube. They were however, for the most part, the worst buildings in the city, and there is little doubt that the spirit of the inhabitants, aided by the munificent contributions sent to them from all parts of the empire, will in a few years efface all traces of the devastation.

(J. v. Thiele, *Das Königreich Ungarn*, vol. vi.; *Oesterreichische National Encyclopädie*; R. E. v. Jenny, *Handbuch für Reisende in Oesterreich*; Blumenbach, *Gemälde der Oesterreichischen Monarchie*.)

PESTILENCE, or PLAGUE, is a disease of so fatal and malignant a nature, that to this very circumstance it probably owes its nomenclature; but some misapprehension exists as to its definite character, and this has originated from writers having applied the terms pestilential and pestilent in a generic sense to diseases specifically different; hence we read of pestilential small-pox, pestilential cholera, &c. In fact every virulent and contagious disease may be called pestilent, but every pestilential disease is not plague. In casting a glance over the histories of these epidemics, it is obvious that many things are involved in obscurity. Numerous facts have however been collected, and are agreed upon by all parties, and we shall endeavour, by a comparison of these, to arrive at some definite conclusion as to the nature of plague. The nosological definition of this disease by Dr. Cullen is perhaps as correct as can be given in few words:—'A typhus fever, in the highest degree contagious, and accompanied with extreme debility. On an uncertain day of the disease, there is an eruption of buboes or carbuncles.' Dr. Patrick Russell, who practised at Aleppo during the plague of 1760-1-2, informs us that its progress at its commencement is much the same in the several parts of the Levant as in the cities of Europe. It advances slowly, fluctuating perhaps for two or three weeks; and although at that period it generally proves fatal, yet it is often unattended by its characteristic eruptions. Indeed the cases in which the eruption is wanting constitute the most rapidly fatal type of the disease. The general derangement of the system which ushers in an attack of the plague, is much like that which commences the course of ordinary fever. A sense of cold, with some shivering, which is soon followed by heat and acceleration of the pulse, with giddiness, headache, depression of strength and spirits, white tongue, vomiting or diarrhœa, and great oppression about the præcordia, are among the first symptoms of the disease. These are succeeded by a burning pain about the pit of the stomach; by a peculiar muddiness of the eyes; by coma, delirium, and other affections of the sensorium, which terminate by death in some cases on the second or third day, before the pathognomic symptoms, buboes and carbuncles, have appeared. In other cases these last-mentioned symptoms are present, together with purple spots and ecchymoses, which belong to the plague in common with other malignant fevers. Though these are the ordinary symptoms of plague, they are not all invariably observed in the same individual; but many varieties occur, which chiefly have reference to the greater or less virulence of the disease, and the absence or presence of some particular symptoms. Thus, we are informed by Sydenham that in the infancy of the great plague of London scarce a day passed but some of those who were seized with it died suddenly in the streets, without having had any previous sickness; the purple spots, which denote immediate death, coming out all over the body, even when persons were abroad about their business; whereas after it had continued for some time, it destroyed none, unless a fever and other symptoms had preceded. Dr. Russell describes six classes or varieties of plague, in some of which the fever appears to have been very violent, while in others it was proportionally mild. The most destructive forms of the disease, according to this author, were marked by severe febrile symptoms; and the infected of this class seldom or never had buboes or carbuncles. The bubo however was the most frequent concomitant afterwards; carbuncles, on the contrary, were remarked in one-third of the infected only, and were seldom observed at Aleppo earlier than the month of May, near three months after the disease began to spread. The carbuncle increased in the summer, was less common in the autumn, and very rarely was observed in the winter. The absence of bubo and carbuncle at the commencement of the plague has been one of the grounds of contention among writers as to the real nature of the disease. Diemerbroech and some others assure us that no one symptom is pathognomonic of plague, and Dr. Russell concludes that 'the plague, under a form of all others the most destructive, exists without its characteristic symptoms, can admit of no doubt.' From all the evidence upon this subject that we have been able to collect, it plainly appears that authors are by no means agreed on the existence of the plague as a distinct disease. The symptoms, morbid changes, history, and mode of propagation of plague, bear so close a resemblance to those of the malignant typhus of this country, that it is difficult to regard them otherwise than as types of the same disease. This opinion is strengthened by the authority of Dr. Mackenzie, who resided thirty years at Constantinople. 'The annual pestilential fever of that place,' he observes, 'very much resembles that of our gaols and crowded hospitals, and is only called plague when attended with buboes and carbuncles.' Sir John Pringle too observes, 'that though the hospital or gaol fever may differ in species from the true plague, yet it may be accounted of the same genus, as it seems to proceed from a like cause, and is attended with similar symptoms.' The buboes which characterise plague consist of inflammatory swellings of the glands in the groin and armpits; the parotid, maxillary, and cervical glands sometimes, but less frequently, become affected. These buboes may either suppurate or gradually disperse: when suppuration occurs, it is seldom till the fever has begun to abate, and is manifestly on the decline, as about the eighth or ninth day. Carbuncles consist of inflamed pustules or angry pimples, which, instead of suppurating, frequently terminate in mortification. They may be seated on any part of the body. The morbid changes that are met with in the bodies of those who die from plague are very similar to what we find in typhus, yellow fever, and in the carcasses of animals that have died in consequence of a putrid matter injected into their veins. The vessels of the brain and its membranes are gorged with a dark coloured blood; the lungs and liver present traces of inflammation or of gangrene; patches of inflammation and ulceration are met with in the stomach and intestines; the heart is of a pale red colour, easily torn, and full of black blood, which, according to M. Magendie, never coagulates. These changes however are not always found, and the same absence of appreciable organic lesion is sometimes observed in typhus and other diseases which prove rapidly fatal. No age, sex, or profession appears to enjoy an immunity from plague, nor does one attack secure the individual from future infection;

but it has been observed that old persons, women, and children suffer less frequently and severely from its attacks than robust adults. Some persons also, who exercise particular trades, as knackers, tanners, water-carriers, bakers, and oilmen, seem to share this advantage; while smiths and cooks were noticed, during the campaign in Egypt, to be more particularly liable to it. One law appears to be universal in all plagues, namely, that the poor are the first and chief sufferers. In Grand Cairo, Constantinople, and Aleppo, it is in the low, crowded, and filthy parts of those cities, occupied by the poorest people, that the plague commits its greatest ravages. The celebrated plague of Marseille, in the year 1720, first appeared in a part of the city noted for the sordid filth, crowded state, and wretchedness of the poor inhabitants. This was likewise true of London, where, from the same circumstance, it obtained the appellation of the Poors' Plague. Like many other diseases, plague is observed in two forms: first, as an indigenous and local disease, peculiar to the inhabitants of certain countries, and from which they are never entirely free; and secondly, as a raging and fatal epidemic, not confined to its original seat, although exhibiting itself there in its most intense forms. It is the epidemic variety of this fatal malady that has engrossed so much attention from the earliest times down to the present; and we shall therefore briefly pass in review some of the principal circumstances which attend its origin, progress, and termination.

It has been observed that nearly all plagues have been preceded by certain natural signs, and by a greater mortality from malignant diseases generally than at other times. Among these precursory signals great and sudden atmospheric vicissitudes have been noted. Livy (v. 13) attributes the origin of a pestilence to this cause. 'The year was remarkable,' he observes, 'for a cold and snowy winter, so that the roads were impassable and the Tiber completely frozen. This deplorable winter, whether it was from the unseasonable state of the air, which suddenly changed to an opposite state, or from some other cause, was succeeded by intense heat, pestilential and destructive to all kinds of animals.' But in the great plague of Athens, of which Thucydides has given so minute a description (ii. 48, &c.), he observes that the year of the plague was particularly free from all other diseases; and he mentions nothing unusual as having occurred in preceding years. The city however was then greatly over-crowded with inhabitants, a great part of the population having taken refuge within the walls of Athens (ii. 16), in consequence of the war. [PERICLES.] Russell informs us that the winter of 1756-7, which preceded the petechial fever of 1758 at Aleppo, and the plague of 1759-60-1-2 in different parts of Syria, was excessively severe. Olive-trees which had withstood the weather for fifty years were killed. In the following summer a dearth ensued from the failure of the crops, and so severe a famine, that parents devoured their own children, and the poor from the mountains offered their wives for sale in the markets to buy food. The connection between famine and pestilence has been noticed in all ages of the world. An enormous increase of insects has frequently been observed to precede a pestilence. We are informed by Short, that in 1610 Constantinople was infested with crowds of grasshoppers of great size that devoured every green thing, and the next year (1613) the plague carried off 200,000 inhabitants of that city. In 1612, swarms of locusts laid waste the vegetable kingdom in Provence; and 1613 the plague appeared in different parts of France. Locusts and pestilence are frequently mentioned together in the sacred writings; and we find that the plagues of Egypt exhibited a series of phenomena, rising in progression from corruption of the rivers and fountains, swarms of insects, murrain among cattle, thunder and thick darkness, and a tribe of inferior diseases, to that fatal pestilence which swept away the first-born of the Egyptians. In fine, dearth or unwholesome provisions, pestilence among cattle, great abundance of insects, absence or death of birds, blight and mildew, appear, with few exceptions, to have separately or conjointly preceded or attended all such calamities. Plague is usually preceded by other diseases which occasion great mortality. Lord Bacon has observed that 'the lesser infections of small-pox, purple fever, agues, &c., in the preceding summer and hovering all winter, do portend a great pestilence the summer following; for putrefaction rises not to its height at once;' and Dr. Mead states, as a general fact, that fevers of extraordinary malignity are the usual forerunners of plague. Indeed nearly all the most remarkable plagues of the last two centuries have been preceded by malignant fevers. The increased number of deaths from this source will be seen by an examination of the London Bills of Mortality at the three last plague epochs in this country, an abstract from which we here present, showing the number of deaths from other diseases besides the plague, in 1625, 1636, and 1665, with that of the year before and after respectively:

Years.	Common Diseases.	Plague.
1624	12,199	11
1625	18,848	35,417
1626	7,400	134
1635	10,651	..
1636	12,959	10,400
1637	8,681	3,082
1664	18,291	6
1665	28,710	68,596
1666	10,840	1,998

The season of the year in which pestilence commits its greatest ravages differs in different countries. In Europe it has invariably raged most violently and fatally in the summer and autumnal months, especially in September. Thus, in the plague of London in 1665, the deaths from the plague were: in June, 590; in July, 4129; in August, 20,046; in September, 26,230; in October, 14,373; in November, 3449; and in December they were under 1000. In Egypt it commences in the autumn, and prevails till the beginning of June, and the vernal equinox is the period of the greatest fatality. Extremes of heat and cold generally check and not unfrequently entirely arrest its progress. In tropical climates the disease is unknown, and in Egypt, according to Alpinus, to whatever degree pestilence may be raging, as soon as the sun enters Cancer it entirely ceases. The cold weather of northern climates has been observed to check the ravages of plague; and in these countries when it has broken out in the autumn, its course has been arrested during the winter months. With respect to the progress and termination of plague, the disease appears to be subject to the same laws as regulate the course and termination of other epidemics: it is most fatal at its first outbreak, and becomes less virulent as it increases in extent. The increased mortality which occurs during the advance of plague, and which we have before shown to be at its height in the month of September, arises from the increased extension and not from the greater malignancy of the disease. With its progress and decline there has usually been observed a progressive increase and decrease in the whole train of diseases, and those which had immediately preceded plague, on its decline reappeared. The former fact will be seen by a reference to the table we have given above.

The causes of pestilence have been referred by some to a vitiated atmosphere, engendered by epidemic and endemic causes, and wholly independent of contagion; while others have attributed it solely to the latter influence. The truth probably lies between these extremes, and we have little doubt, from an examination of the evidence on both sides of the question, that both these causes do occasionally operate in the propagation of plague. As the foundation of quarantine establishments rests entirely on the supposition of the contagious nature of plague, we shall examine how far this can be supported by a reference to facts. It is asserted by the contagionists that plague is transferred from individual to individual in all the ascertained modes in which diseases are thus communicated—by contact, by inoculation with the matter of buboes, through the atmosphere, and by fomites. According to them, its appearance in Western Europe has been always owing to imported contagion; and where strict isolation from all infected individuals and articles has been observed, there it has never appeared. It is admitted however by several, among whom may be mentioned the respected names of Sydenham, Russell, and Mead, that a peculiar atmospheric condition is essential to the spread of pestilence; yet they maintain that this is inadequate to its production without importation by fomites, or the arrival of a diseased person from an infected district. In support of this opinion, they refer to the histories of the different plagues that have visited Europe, and above all to that which ravaged Marseille in the year 1720. Its introduction into this city was traced to the arrival of three ships or lazarettos, which, by some means or other, for we learn not how, communicated the disease to a woman living in the Rue de l'Escale. This person being received into the Hôtel Dieu, two of the nurses who assisted at her reception, and the matron who changed the linen, were taken ill the next day, and died after a few hours. In a short time it destroyed physicians, surgeons, apothecaries, confessors, and all the other officers and servants, with the whole of the poor in the hospital, including above 300 foundlings. The priests and monks who attended the infected, suffered in the same manner as the medical assistants: and lastly, of 230 galley-slaves, employed in going into the infected houses and burying the dead, 220 perished in the space of ten or twelve days. Many of these facts however may be not inaptly termed false facts; and some, of undoubted existence, that are brought forward as examples of contagion, may be explained on another hypothesis. It is admitted by all that animal effluvia, from a number of persons crowded into a small space, and surrounded by their own filth, acquire a high degree of virulence, even without the morbid action of a febrile affection. If then, to the circumstances above noticed, are superadded corrupt food and the influence of a sickly season, is it surprising that miasmata endowed with a most pestilential contagious power should be generated? But this rapid transit of plague from one individual to another is only what we know to take place in other epidemic diseases. To illustrate this position by a familiar and well-known disease—epidemic catarrh, or influenza: what is more common than for all the members of a family living together, the clerks in the same office, and the artisans of the same workshop, to be successively or almost simultaneously attacked? Yet nobody attributes the circumstance to contagion: certainly, if one had a motive for so doing, nothing would be easier than to accumulate examples without number in support of this position. Whatever share then contagion may have in the propagation of the plague, it is quite certain that its power has been greatly overrated. According to the most staunch supporters of this doctrine, a particular state of the air is essential to its action; and they all admit that whenever the plague has been excited out of its proper season, it has not spread. Without being understood to advocate the contagious origin of plague, we fully agree with Dr. Bancroft that 'it is fortunate for mankind that the communication of the contagion of the plague depends upon the co-operation of so many favourable circumstances, and particularly upon that of a suitable temperature, and of certain aptitudes and susceptibilities in the human subject; for without such requisites, or such obstacles to its propagation, the earth might have long since become desolate.' Those who contend for the non-contagiousness of plague, and therefore for the abolition of the quarantine laws, maintain that these laws, however strictly enforced, have not succeeded in shutting out the plague from pestilential districts; and that countries not possessing indigenous sources of pestilence are not visited with this disease, although unprotected by quarantine establishments. They likewise adduce numerous instances of persons in constant communication with plague patients, and even wearing their clothes, escaping the disease. Odessa has one of the best organised quarantine establishments in the world; yet not long ago the plague broke out in it, entered the town, destroyed a number of inhabitants, and ceased at a particular season. In 1835 the harem of the pasha of Egypt consisted of about 300 persons; but notwithstanding the severest cordon, the plague entered, and seven died within. The cordon was composed of 500 men, who were in constant contact with the town, where the disease was raging violently; of these only three died, so that the proportion of those who perished within to those without was nearly as 4 to 1. The plague of 1665, which ravaged most parts of this kingdom, never visited Oxford, although the terms were kept there, and the court and both houses of parliament were held there; a close correspondence too was maintained between this city and the metropolis, where it was raging. The Persians, although their country is every year surrounded by the plague, seldom suffer anything by it themselves. 'The Turks and Moors,' says Bruce, 'immediately after St. John's day, expose in the market-places the clothes of the many thousands that have died of the plague during its late continuance; and though these consist of furs, cotton, silk, and woollen cloths, which are stuffs the most retentive of the infection, no accident happens to those who wear them.' Clot Bey, who is at the head of the medical department in Egypt, and has treated thousands of cases, says, that removed from malaria or miasm, he has never known the plague to be communicated by contact. He has twice inoculated himself with the pus and blood of those affected with plague, but without producing the disease.

This fully agrees with the evidence that was given before a select committee of the House of Commons, on the contagion of plague in 1819. It appears from the Custom-house Returns, that none of the expurgators of goods in Great Britain, at the quarantine establishments, have ever taken the plague. What then are we to regard as the cause of pestilence, and whence is it to be sought? Undoubtedly in the miasm of pestiferous soils; or of crowded, ill-ventilated, and filthy localities. When plague has at any time become epidemic, these are the spots in which it has first planted itself, and in which it has committed the greatest devastation. Notwithstanding the obviousness of this fact, it is a remarkable circumstance in connection with the history of plague, that no people in the world have been willing to acknowledge their own country to be the first or indigenous seat of pestilence. The doctrine that it is imported and not indigenous, is as prevalent in Turkey as it is in Egypt. The Egyptian Levantines insist that it has never been an Egyptian endemic, but has been imported by travellers or goods; while the Turks contend that it is from Egypt. In the eloquent language of Dr. Hancock, 'Egypt disowns it; Ethiopia has no such progeny; Syria is too genial for its production; and Constantinople harbours it through neglect or sufferance. As to the north, how could the temperate climate of Britain generate a principle so terribly destructive?' Facts however are too numerous and weighty to allow us a moment's hesitation on this point. Wherever civilization has advanced, there plague has receded, till it is now only to be found lurking among the swamps of Egypt or revelling in the filth of Constantinople. It is the spring, we have seen, that is so fatal to the Egyptians, about which time south winds prevail, loaded with putrid emanations from animal and vegetable substances in the lakes formed by the retiring waters of the Nile. In June, the wind is in the north, passing over the Mediterranean, and this is the most healthy and salubrious season. In Constantinople, the month of August is most fatal, and this is the season of the year when decomposition goes on with greatest rapidity. The exemption of the city of Oxford, in the plague of 1665, is a strong proof of the correctness of these opinions. The following words from Quincy are much to the purpose: 'Dr. Plott observes, the reasons why Oxford is now much more healthful than formerly, to be, the enlargement of the city, whereby the inhabitants, who are not proportionately increased, are not so close crowded together; and the care of the magistrates in keeping the streets clear from filth. For "formerly," he says, "they used to kill all manner of cattle within the walls, and suffer their dung and offals to lie in the streets. Moreover about those times, the Isis and Cherwell, through the carelessness of the townsmen, being filled with mud, and the common-shores by such means stopped, did cause the ascent of malignant vapours whenever there happened to be a flood. But since that, by the care and at the charge of Richard Fox, bishop of Winchester, in the year 1517, those rivers were cleansed, and more trenches cut for the water's free passage, the town has continued in a very healthful condition, and in a particular manner so free from pestilential diseases, that the sickness in 1665, which raged in most parts of the kingdom, never visited any person there, although the terms were there kept, and the court and both houses of parliament did there reside."' Now what was done in Oxford, as early as 1517, to remedy its unhealthiness, has since been done in all the principal cities of this country and on the Continent. Accordingly we find that the plague has not visited us since 1665. Holland, which has no system of quarantine, has experienced an exemption corresponding to that of our own country. Paris has not been attacked since 1668, and a century has elapsed since the plague of Marseille.

Treatment of Plague.—The preventive treatment of plague will be gathered from what we have said respecting the causes of this disease, and the most effectual barriers that can be opposed to its future introduction into Europe, are, to adopt again the language of Dr. Hancock, 'the barrier of cleanliness in our towns and villages against filth and crowded habitations; the barrier of Christian charity towards our poor against famine and distress; the barrier of peace against the desolating evils of war; and the barrier of industry against the vice of sloth.' With regard to remedial measures, it appears little can be done towards arresting the progress of plague after it has once declared itself in an individual. Our efforts therefore are limited to removing the patient from those sources of miasm which gave origin to his disease, and in placing him in those conditions which are most favourable for his recovery. Free exposure to fresh air, supporting the strength, and regulating the secretions, are the only means which promise much chance of success. When this plan is adopted, we have the authority of our latest writers on this subject for declaring that the mortality of the disease may be considerably diminished. Thirty per cent. only, of those attacked, die under this mode of treatment; while in the lazaretto at Alexandria, 90 per cent. died in 1833, and 77 in 1836. With respect to the management of buboes and carbuncles, they must be treated in the way which is found efficacious in their removal when uncomplicated with plague, and if by these means we are unable to effect their dispersion, suppuration may be promoted by the employment of emollient cataplasms or any other mild stimulant.

In the following chronological table of some of the principal plagues upon record, we have purposely omitted the mention of many which, although described under that name, are obviously a different disease; even among those we have selected, the vagueness with which the symptoms of some are described, leave us in doubt whether the disease was the same as that which at present goes under the name of plague:—

B.C.

1491. The plague of Egypt. *Exodus*, xii.
1490. „ in the Wilderness. *Numbers*, xi.
1250. „ of Ægina. Ovid's *Metam.*, lib. vii. 523.
1190. „ in the Grecian camp at the siege of Troy. Homer's *Iliad*, book i.
1141. „ among the Philistines. 1 *Sam.*, v. and vi.
1017. „ in Canaan. 2 *Sam.*, xxiv.
738. „ of Rome. Plutarch's *Life of Romulus*.
464. „ „ Livy, iii. 6; Dion. Halicar., lib. x.
454. „ „ Livy, iii. 32.
437. „ „ Livy, iv. 21, 25.
430. „ of Athens. Thucydides, ii. 48, &c.
404. „ of Carthage. Justin, xix. 2; Diod. Sic., xiii., xiv.
366. „ of Rome. Livy, vii. 1; Short *On Air.*
296. „ „ Livy, x. 31, &c.; Orosius, iii. 21.
213. In the Cathaginian and Roman armies before Syracuse. Livy, xxv. 26.
182-177. Rome and all Italy. Livy, xli. 21.
126. Numidia and Carthage. Livy, *Epit.*, 60; Orosius, lib. v.

A.D.

68. Rome. Tacitus, *Annals*, xv. 47; xvi. 13; Orosius, lib. vii.; *Univers. Hist.*, vol. xiv., 139.
167 and few following years. Rome and a large part of the known world. Am. Marcellinus, lib. xxiii.; Echard's *Rom. Hist.*, vol. ii., 315, &c.
187. Rome and Italy. Herodian, lib. i.
252-270. Rome and a large portion of the globe. Zonaras, lib. xii.; Gibbon, vol. i., 10.
407. Most of Europe, Asia, and Africa. Nicephorus, xiii. 6 and 36; Magdeburg, cent. v. 13.
542-590. A plague raging, with intermissions, in most parts of the world. Niceph., xvii. 18; *Eccles. Hist.*, lib. iv., 29.
1345-1350. Europe, and most parts of the world. Boccaccio, *Decameron*, 'Prima Giornata;' Muratori, iii. 588, &c.; Villari; Short *On Air*, vol. i., 165; *Univ. Hist.*, vol. xxxii.
1562 and 1663. London and most of the principal cities of Europe. Short, vol. i.; Thuanus.
1575 and 1576. Italy and most parts of Europe. Thuanus, lib. lxii.; Short, vol. i.; Mercurialis *On the Plague of Venice*.
1580 and 1581. Grand Cairo and different parts of France. Thuanus.
1600 and 1603. London and various parts of Europe. Maitland's *Hist. of London;* Mignot, *Hist. of the Turkish Empire*, p. 256.
1611 and 1613. Constantinople, France. Riverius, lib. xvii.; Short, vol. i.; Mignot.
1625. London and various parts of Europe. Short.
1635 and 1636. London, Nimeguen, and several other places in Europe. Diemerbroeck, *Tractatus de Peste*.
1655 and 1656. Most of Europe. Naples suffered very severely, three-fourths of its inhabitants having perished. *Univ. Hist.*, vol. xxviii., 318.
1563-65. London and most parts of England and Holland. Sydenham; *City Remembrancer;* Hodge's *Loimologia.*
1702-11. North of Europe. Described, especially as it appeared in Danzig, by Dr. Gottwald; and *Univ. Hist.*, vol. xxxv.
1720. Of Marseille. Chicoyneau's *Traité de la Peste;* Bertrand's *Relation Hist. de la Peste de Marseille.*
1743. Aleppo. Its *Natural History*, by Dr. Alex. Russell.
1751. Constantinople. Chenier's *Marocco*, vol. ii., 275.
1760-62. Aleppo, Jerusalem, and Damascus. *A Treatise of the Plague, &c.*, by Dr. Patrick Russell.
1770 and 1771. Constantinople, Poland, and Russia. Described, especially as it appeared in Moscow, by Mertens; and *Ann. Regist.*, 1772, p. 155.
1783-85. Egypt, Dalmatia, Constantinople, &c. Volney's *Travels*, vol. i., 192; *Courant*, October 28, 1783, and October 27, 1785.
1799. In the French army in Egypt. Sotira, *Mémoire sur la Peste observée en Egypte pendant le Sejour de l'Armée d'Orient dans cette Contrée;* Baron Larrey, *Description d'Egypte, &c.*

For further accounts of the plague, as it has appeared more recently, see Tully's *Hist. of the Plague in the Islands of Malta, Gozo, Corfu, Cephalonia, &c.*, 1821; also Dr. Bowring's *Observations on the Oriental Plague and on Quarantine, &c.*, 1838.

Pestilential, Epidemic, or Asiatic Cholera is a disease not less fatal than that described in the preceding article; and in its endemic origin, its occasional epidemic eruptions, its selection of victims, and the localities which it ravages, it bears a striking resemblance to plague. Its essential character is however perfectly distinct, as will be seen by the following account of the symptoms of cholera. The disease has two well-marked stages: the cold or choleric, called also the stage of collapse; and the hot or febrile stage, or that in which reaction takes place. The first is generally preceded by certain premonitory symptoms, among the most prominent of which is diarrhœa, accompanied usually with languor and some degree of nausea; the dejections are fæcal and bilious, and often very copious. The commencement of the purging may precede the accession of the febrile stage for several days, or only a few hours may elapse. It is important not to think lightly of this disorder during the prevalence of epidemic cholera, for many a life might have been preserved if timely warning had been taken, and appropriate treatment adopted for removing it, before the accession of the symptoms about to be described.

Symptoms of the Cold Stage.—The time of its invasion is, in the majority of instances, from two to four o'clock in the morning. The patient is attacked with uneasiness of the stomach, to which speedily succeed vomiting and purging of a watery, colourless, and inodorous fluid, similar to barley-water, or more frequently to rice-water: sometimes it is like milk, and occasionally yellowish; but the 'conjee-stools,' as they are termed, which consist of albuminous flakes floating in serum, or discharges of pure serum, are of the most frequent occurrence. These discharges are attended with severe cramps in the extremities, especially in the calves of the legs, and are succeeded by exhaustion, giddiness, and sinking of the pulse; the pulse is small, weak, and accelerated; and after a certain interval, becomes imperceptible. The skin is cold from the commencement; and as the disease advances, it becomes gradually colder, and is covered either with a profuse sweat or a clammy moisture. The features are shrunk and anxious: there is restlessness and agitation, with great thirst, heartburn, and hurried respiration. Notwithstanding the coldness of the body externally, the patient complains of heat, and throws off his bed-clothes. As the cold increases, the skin frequently becomes blue; the eyes, which are dull and suffused, seem drawn into and fixed at the bottom of their sockets; the tongue is cold, but moist; the voice is feeble, hollow, hoarse, and interrupted; but the mental functions remain undisturbed to the last. At this advanced period the collapse is complete, the respiration very slow, and the patient, who suffers little or no pain, presents the appearance of a person who has been dead for some time. The urine is usually suppressed throughout the whole of this stage; but the dejections, becoming thinner and thinner, continue to the last. Some patients, although blue, cold, and pulseless, have sufficient strength to go about· many however die of exhaustion before all these symptoms have declared themselves. In the majority of cases the spasmodic symptoms are first observed, and afterwards the collapse: the former are characterised by pain, evacuations, and moans; the second, by the suppression of voice, urine, and heat. If however the patient get over the cold stage, that of reaction commences. The coldness and blueness gradually disappear; the pulse returns, increasing in force and frequency; to the pale or blue cheek succeeds the flush; the eye brightens; the tongue, which was of a dirty white, becomes cleaner and dry; vomitings are less frequent, but diarrhœa continues; and there is some tenderness of the abdomen, with thirst, great disgust of food, and intense headache. The urine however is secreted; and if all goes on well, at the end of two or three days the features assume their usual expression; the stools are less frequent and more natural; the strength and appetite begin to return; the pulse resumes its ordinary character; and the patient is convalescent. Several varieties occur in the duration and intensity of cholera, and complications are sometimes produced of a character not less fatal than the disease itself. We are informed by M. Dalmas, that soldiers attacked in full march will retire from the ranks, lay down their arms by the road-side, and expire in two hours. During the prevalence of the last epidemic in India, several instances were heard of at Houbley and other places in that country, of natives being struck with the disease while walking in the open air; they fell down, retched a little, complained of vertigo, deafness, and blindness, and expired in a few minutes. This rapidly fatal form of cholera has not been observed in this country. The most severe cases that we have met with generally lasted five or six hours; but the average duration of the fatal cases, when they did not terminate in consecutive fever, was from twelve to fourteen hours. When reaction was established, and fever supervened, the duration of fatal cases was from four to ten days. As a general rule to guide us in forming a prognosis, it may be stated that the more complete is the collapse, the greater is the danger; and if the patient survive it, the more violent and malignant is the subsequent fever. The cases in which spasms and vomiting are most violent are by no means the most dangerous.

Morbid Anatomy of Cholera.—Dissection presents us with nothing satisfactory by which we can judge of the nature of the disease. There is general venous congestion of all the important organs in the body; but it is rare that any traces of inflammation are discovered. The gall-bladder is mostly distended with bile, and its ducts are constricted. In the stomach and intestines is found either a transparent or a turbid serous fluid, mixed with a white opake substance in the form of flakes, and similar in all respects to the matters ejected during life. The mucous membrane lining the intestinal canal is most frequently of a pale white colour, and somewhat more soft and pulpy than in its natural condition; but occasionally some degree of vascularity is observed. The urinary bladder is empty and contracted. With respect to the blood, it is found to be more viscid, and darker coloured than natural, which arises from a deficiency of its saline and watery components, and a relative increase of its solid constituents. In 1000 parts of serum, Dr. O'Shaugnessy found 133 of albumen, whereas healthy serum contains only 78 parts. On comparing the blood with the matter found in the intestines, it is manifest that the latter contains all the ingredients of the blood, except the red globules; and that the aqueous and saline parts pass out of the circulation more rapidly than the albuminous.

History and Statistics of Cholera.—The last outbreak of pestilential cholera, which commenced in India and traversed successively nearly every country in the world, was perhaps the most diffused and best observed of any similar visitation: the observations we shall have to make will therefore chiefly relate to this epidemic. It originated in the district of Nuddeah and in some other parts of the delta of the Ganges, about the end of May or the beginning of June, 1817. During that year it did not extend beyond the territory of Lower Bengal; but in 1818 and the early part of 1819 it diffused itself throughout the extreme length and breadth of the Indian peninsula, yet leaving untouched many districts placed between its lines of movement. Its progress along the lines selected was wonderfully uniform, being, for some successive months, at the rate of about one degree in a month. As early as 1818, it extended itself beyond the boundaries of Hindustan into the Burmese empire and other parts of Eastern Asia, and making gradual progress through these countries, reached China in 1820, and in the following year visited the numerous and populous islands of the Indian Archipelago. The Isle of France suffered its invasion in 1819, and some cases occurred in the same year at one point in Bourbon. In 1821 it extended along the shores of the Persian Gulf, and, during this and the following year, spread through parts of Arabia, Persia, and Syria, and closely threatened Europe. It appeared in the Russian territories in 1823, at Tefflis, Orenburg, and Astrakan; but its farther northern and western progress was stopped for a time. It however re-appeared in Orenburg in 1828, and again in 1829, and in 1830 advanced through the southern provinces of the Russian empire, till it reached Moscow on the 28th of September of that year, and Petersburg the year following. Warsaw was attacked in March, 1831; Danzig in May; Berlin, in August; Hamburg and Sunderland in October; and London and Paris in 1832. At the end of 1833 it had reached Mexico and several other parts of America. We see that the course of the epidemic was principally from east to west, and it was observed that prior to its appearance in many countries, and during its continuance, easterly winds were uncommonly prevalent; but most accurate and extensive meteorological observations, made daily during the continuance of the disease, prove that neither variations of temperature, fluctuations of the barometer, change of wind, nor the prevalence nor absence of moisture, affect in the slightest degree its duration or intensity. Bowel complaints appear to have preceded the cholera in most places, and to have continued for some months after its cessation. In many localities the disease existed only for a few weeks, while in others it lingered for several months. In the first case, the mortality was invariably high; in the last, the malignancy of the disease generally diminished as its stay was prolonged. Into whatever country or town the disease advanced, its first and most deadly fury was expended upon the poorest and most miserable of the population, and upon those who inhabited crowded districts, or low humid localities bordering on a port or river. Among this class of individuals whole families were sometimes cut off by it; indeed it is a peculiar feature of epidemic cholera that its ravages are confined almost exclusively to the poor. When the disease has appeared in a family occupying a station in life above the labouring class, we have the authority of Dr. Brown for declaring that in every case it has been confined to the individual first attacked, and has not in any instance spread to the other members of the family. The mortality from this disease is very great; but it varies somewhat in different countries and at different stages of its epidemic career. During its early prevalence in India, in 1817 and 1818, we learn, from the 'Report to the Medical Board at Bombay,' that there is reason to believe that of 1294 cases which received no medical assistance, every individual perished; and it is added, that it is not ascertained that any person has recovered to whom medicine had not been administered. This appalling statement however is without parallel, and it is gratifying to know that where the premonitory symptoms have been combated by early and judicious treatment, the mortality has always been diminished. This is strikingly exemplified by the statistical records kept at our different military stations in various parts of the world. In all situations and under all modes of treatment, about one in two died of the cases in civil, and one in three of those in the military hospitals; a result doubtless to be attributed to the strict surveillance exercised over the troops, by which nearly one-half of the cases among them were noticed in the premonitory stage, and consequently could be treated with a greater prospect of success than those in the civil hospitals, where the great majority of the patients were far advanced in the disease before they applied for medical aid. Of the severe cases however the mortality is probably nearly the same in all, being about 60 per cent. One of the most extraordinary features of this epidemic, observes Major Tulloch, is that the proportion of deaths to the number attacked has been very nearly alike in all the military commands of which the medical records have been investigated: for instance—In the United Kingdom, the deaths were 1 in 3¼; in Gibraltar, 1 in 3½; in Nova Scotia, 1 in 3⅓; in Canada, 1 in 3; in Honduras, 1 in 3; in the Mauritius, 1 in 8⅓. The Mauritius appears to be the only exception to this; so that either the epidemic was less severe in its character, or the remedies employed were more successful.

The influence of age on the mortality by this disease among the troops of the line serving in Canada is exemplified in the following table:—

Age.	Ratio of Deaths at each Age, per 1000 of strength, by Epidemic Cholera.
Under 18	—
18 to 25	15·5
25 to 33	23·
33 to 40	36·6
40 to 50	70·6

It appears from the authority to which we are indebted for the foregoing table, that females were attacked in very nearly the same proportion as males, but that the cases proved more generally fatal. Children were in a great measure exempt, though, when attacked, they rapidly sunk under it. The greater mortality of the disease in females has also been observed in this country. Dr. Ogden informs us that of 145 fatal cases of cholera at Sunderland, 63 were males and 82 females. The information which we possess on the relative mortality of the disease in the different races of mankind is rather meagre. The native Indians of North America suffered from it in an equal degree with the white population; and the same was observed with regard to the Sepoys in our Indian army. In the Mauritius, whose population in 1831 was 90,000, of which 25,000 were whites and the rest coloured, the total number of deaths recorded in the civil and military hospitals was 1327. Of these 168 were whites, 162 coloured, and 997 blacks, principally negroes, who seemed peculiarly subject to the disease. This great susceptibility of negroes to the invasion of disease, when absent from their native land, we have had occasion to notice in the article Phthisis; and that time seems to have had little effect in weakening this susceptibility, appears from a comparison of the mortality among them in the present epidemic with that which took place during a similar epidemic in this island in the year 1775. At this date, more than 2000 out of 4300 slaves belonging to government were cut off by it, and of those belonging to the planters nearly as many.

Causes of Cholera.—That the whole series of phenomena results from the action of a morbific poison on the body, there can be no doubt; that this morbific matter is indigenous to some countries, and apparently has its origin in certain peculiar conditions of the soil, is supposed to be true from the effects which we find to be produced upon animal bodies living in these districts. But why the miasm arising from the overflow of the Nile should produce plague; that of the Ganges, cholera; that of the parts situated in the tropics, yellow fever; or our own marshes, simple intermittent—we are entirely ignorant; nor can we, in the present state of our knowledge, at all account for the epidemic spread of some of these endemic diseases. The doctrine of contagion has been had recourse to in cholera, as in many other diseases, in order to explain its diffusion, and it has been asserted by the advocates of the exclusive operation of this principle, that the disease has always been found to move in the line of human intercourse; and it must be acknowledged, observes Dr. Brown, that while so migratory an animal as man inhabits the earth, it cannot well do otherwise. But if it is meant to be asserted that its diffusion has been in proportion to the intercourse between infected and healthy districts, the assertion is by no means supported by facts. Its appearance at Madras, for instance, whither, according to this doctrine, it ought to have been conveyed almost three months earlier by trading vessels from the infected districts, was simultaneous with its appearance in parallel latitudes in the interior. It did not reach Ceylon, to which, on the contagious principle, it ought to have been conveyed much earlier by shipping from the infected points of the coast, until it had previously gained the nearest point to it on the continent, and had been long prevalent on both coasts of the peninsula. In its importation into this country likewise, supposing it to be imported, so far from following the great routes of human intercourse, it chose one of the least frequented paths. The principal evidence on this point, which was collected during the last epidemic cholera, goes to negative its contagious character; and the advocates of the contrary opinion are at present by far the more numerous party. Of fifteen medical reporters in India who had observed the disease, two only thought it contagious, eight were of a contrary opinion, and five were doubtful. The medical officers at Gibraltar seem to have been almost unanimous in their opinion that the disease was not contagious. In the same ward with the cholera patients in the civil hospital were several persons labouring under other diseases, who, although in constant communication with and frequently in attendance on those suffering under the epidemic, were in no instance affected by it. In the military hospital too it was observed that the orderlies employed in attendance on the sick were not attacked in a greater proportion than others who were not so employed; and of thirty medical officers in constant attendance on the sick during the prevalence of the epidemic, all of whom, from the nature of their duties, were subject to great fatigue and anxiety, only one or two exhibited any symptoms of the disease, and their cases were comparatively slight. Nevertheless it is probable that under some circumstances cholera may be contagious, and this opinion derives support from the great mortality which was always observed under the operation of the quarantine laws, on the inutility of which, in this disease at least, all medical men are agreed. The predisposing causes of cholera may be gathered from its history. The poor, the old, the infirm, and the dissipated were the principal sufferers. In the north of Germany, Tuesday was always the day of the greatest mortality, owing, it was supposed, to the excesses committed on the two or three preceding days. Hence every circumstance which tends to debilitate the system generally, whether occasioned by atmospheric vicissitudes, by residence in an unhealthy locality, by unwholesome or insufficient food, by the abuse of spirituous liquors, or by debauchery, acts as a predisposing cause in the production of cholera.

Treatment of Cholera.—Premising, in a prophylactic point of view, the superiority of avoiding all the predisposing causes of cholera to the absurd practice of swallowing specifics against the disease, our treatment must be regulated according to the state in which we find the patient. If the premonitory symptoms only are present, the stomach should be unloaded by an emetic, and a table-spoonful of good mustard constitutes a very efficient one. The diarrhœa may be treated by a full dose of calomel and opium, combined with some aromatic, and a blister should be applied to the abdomen. Bleeding also has been recommended at this period of the disorder. If the patient is already in a state of collapse, the various modes of treatment which have been adopted prove how little is to be effected when the disease has advanced to this stage. Major Tulloch informs us that the principal remedy of the American aborigines consisted in merely swallowing large quantities of charcoal mixed with lard; yet very nearly the same proportion recovered as among the white inhabitants of the towns who had the advantage of the best medical science. In this country, blood-letting, cold affusion, hot-baths, emetics, purges, astringents, sedatives, and stimulants of the most powerful kind, have been successively tried with very doubtful advantage. The plan however which has excited most attention is that by salines. Medical men, guided by chemical analysis, conceived the project of supplying by artificial means the serum which was found wanting in the blood. With this view lavements and potions of an alkaline solution, resembling serum in composition, were administered; but not being able by this means to arrest the vomiting, it was recommended and put into practice by Dr. Latta of Leith to inject the same fluid into the veins. This was first done by means of one of Reid's syringes, the temperature of the solution being kept at from 108° to 110° Fahr. Of 74 bad cases treated in this method, 22 recovered, and in one case only did any unfavourable symptoms occur, and this was from phlebitis, or inflammation of the veins. As much as 33 lbs. of this alkaline solution have been injected in the space of 52 hours, and with a successful result. Some practitioners have even exceeded in amount this quantity. The composition of the saline injection employed by Dr. Latta consisted of two drachms of common salt and two scruples of carbonate of soda dissolved in sixty ounces of water; but this formula has been slightly varied in different cases. The immediate effects observed on injecting this fluid into the veins are, an increase of the temperature and perspiration, a reappearance of the pulse, if before imperceptible, or it becomes fuller, stronger, and slower, when it was before small, frequent, and feeble. The collapsed appearance of the countenance gradually vanishes; it becomes fuller and more natural; the eyes brighten, the thirst diminishes, and the patient expresses himself in terms of gratitude or satisfaction at the wonderful change wrought in his feelings. But this change is evanescent; the purging continues, and the patient is shortly reduced to the same hopeless state in which he was previous to the adoption of this treatment. By recommencing the injections, the same beneficial results are obtained, and, provided this treatment prove successful, the patient does not again relapse into his former condition, but the diarrhœa and vomiting diminish, and reaction commences. With respect to the treatment of the febrile stage of cholera little need be said. The same recognised principles that are applicable to the treatment of pyrexia in general must be our guides in treating this fever; and the physician should never neglect to impress upon his patient the probability of a relapse, if he should indulge too soon in any dietetic or other irregularities.

PETAL is one of the inner divisions of the organs clothing a flower, and called floral envelopes. These are usually double, the outer being a calyx composed of sepals, and the inner a corolla composed of petals. Both these parts are leaves incompletely organised. The petal, being fugitive, and of very temporary utility, is generally the more delicate, containing no woody tissue to protect the spiral vessels. It is sometimes of extraordinary size, but is as frequently a very minute body. [Corolla; Morphology; Flower.]

PETALISM. [Ostracism.]

PETALITE, a mineral which occurs massive. Structure perfectly lamellar in one direction. Cleavage parallel to the lateral planes, and both diagonals of a rhombic prism. Fracture uneven. Hardness 6·5. Brittle. Colour greyish, greenish, or reddish-white. Streak white. Lustre vitreous, inclining to resinous. Translucent. Specific gravity 2·42 to 2·45. When heated in acids, it undergoes partial decomposition; emits a blue phosphorescent light when gently heated. When by itself, it melts with difficulty, and only on the edges; but with borax, it fuses into a colourless glass.

It occurs at Utön in Sweden, and in North America. It consists, according to Gmelin, of—Silica, 74·17; Alumina, 17·41; Lithia, 5·16; Lime, 0·32; Water, 2·17.

PETARD. [Artillery.]

PETAURUS. [Marsupialia, vol. xiv., pp. 460, 461.]

PETA'VIUS, DIONYSIUS PETAU, born at Orleans, in 1583, studied at Paris, and afterwards entered the order of the Jesuits. He lectured on rhetoric in the colleges of Rheims, La Flèche, and lastly at Paris, in which he was made professor of theology in 1621. He applied himself assiduously to classical and historical studies, and became a distinguished scholar and critic. In 1627 he published his great work on chronology, 'De Doctrinâ Temporum,' 2 vols. folio, which was republished with considerable additions by himself, as well as by Hardouin and others, in 3 vols. folio, Antwerp, 1703. The 'Doctrinâ Temporum' consists of 13 books. In the first 8 books, Petau discusses the principles of the science of chronology, antient and modern; in books 9 to 12, he examines the application of chronology to history, the various æras, &c.; and in the last or 13th book he gives chronological tables of the principal events from the creation to the reign of Justinian. After the publication of the work, Philip IV. invited Petau to Madrid to fill the chair of history, but Petau declined the offer, as well as an invitation to go to Rome by Pope Urban VIII., preferring the tranquillity of his cell in the Jesuits' college of Clermont at Paris, where he died in 1652. Just before his death he published 'Rationarium Temporum,' 2 vols. 8vo., 1652, which is a kind of abridgement of his great work, and forms a useful manual of universal chronology. It has gone through many editions, and has been translated into French: 'Abrégé Chronologique de l'Histoire universelle, sacrée et profane,' 5 vols. 12mo., Paris, 1715. Perizonius published an edition of the 'Rationarium Temporum,' with a continuation down to 1715. At the end of the work are lists of the Roman consuls, the popes, the emperors of the Eastern and Western empires, of the various dynasties of modern Europe, as well as of the councils, and of the various heresies and schisms. Petau wrote also 'De Theologicis Dogmatibus,' 3 vols. fol., Antwerp, 1700. He edited the Breviarium of Nicephorus, in Greek and Latin, with notes, Paris, 1648; the works of Synesius, bishop of Ptolemaïs in Cyrenaica; and those of St. Epiphanius, with a Latin translation, 2 vols. folio, Paris, 1622. He also wrote a dissertation upon Photinus, 'De Photino Heretico.'

PETE'CHIÆ are small spots of a dark red colour produced by the effusion of drops of blood in the skin just beneath the cuticle. At first sight they look very like flea-bites, but they do not disappear when they are pressed with the finger. They usually indicate an altered state of the blood, and are often symptoms of very serious diseases, as in typhus fever (some varieties of which have hence been called petechial fever), scurvy, purpura, &c. They commonly appear also in very severe cases of small-pox, measles, and scarlet fever, and are amongst the worst symptoms by which those diseases are marked.

PETER, ST., one of the twelve Apostles, was born at Bethsaida, on the western side of the lake of Gennesareth. His name at first was Simon, which was changed by our Lord into Cephas, a Syriac word signifying a stone or rock; in Greek, *petra*, whence Peter. In conjunction with Andrew his brother, he followed the occupation of a fisherman. Both were hearers of John the Baptist, by whom they were taught that Jesus Christ was the Messiah. While plying their business on the sea of Galilee, the Saviour called them to be his disciples:—'Follow me, and I will make you fishers of men:' immediately they quitted their boats and nets, and became his intimate friends and constant associates. Peter was one of the three, James and John being the others, who were favoured by our Lord with peculiar marks of his confidence.

Peter was a man of an open and generous nature, strong in his attachments, ardent, and precipitate. He was prompt on every occasion to exhibit his zeal in behalf of his master, of which we have a memorable instance in his conduct towards the high-priest's servant, whose ear he cut off when the Jewish officers were about to apprehend our Lord. Yet, notwithstanding the ardour of his character and his solemn declaration to the contrary, he denied Christ when he was in circumstances of danger. After the denial, 'Jesus turned and looked upon Peter.' That look entered his heart; and stung with deep compunction, he went out and wept bitterly.

On the day of Pentecost which succeeded the ascension of our Lord, the Holy Ghost descended upon the Apostles, and produced the most astonishing and extraordinary results. The gift of tongues came upon them; and they were enabled to address the inhabitants of different nations, each in his own language. On this occasion the character of St. Peter sustained a singular change; and he preached with so much effect, that three thousand were converted to the Christian faith. He now took a prominent position among the Apostles. When a miracle is performed, it is Peter who avails himself of the opportunity, and preaches to the people. When brought before the council for declaring the resurrection of their Master, it is Peter who speaks in reply to the charges against them. In the case of Ananias and Sapphira, it is Peter who detects and punishes the fraud.

Being at Joppa in the course of his apostolic labours, he converted Cornelius, a Roman centurion, the first Gentile who was admitted into the Church without circumcision. This event was considered satisfactory evidence that the benefits of the Gospel were intended, not for the Jews only, but for mankind universally. Shortly after, the zeal and success with which he propagated the new religion induced Herod Agrippa to cast him into prison, from which he was miraculously delivered by an angel. The last important transaction in which we find him engaged was in the apostolic council held at Jerusalem, A.D. 49, when it was decided that Christianity required of its converts neither circumcision nor the observance of any other rite of the Jewish institute. It is supposed that he afterwards preached to the Hebrew Christians dispersed through Pontus, Galatia, Cappadocia, Asia Minor, and Bithynia; and that he visited Rome, A.D. 63, where he soon after suffered martyrdom.

St. Peter was the author of two Epistles, both of which make part of our canonical Scriptures. The first, whose genuineness and authenticity have never been questioned, is addressed 'to the strangers scattered throughout Pontus, Galatia, Cappadocia, Asia, and Bithynia.' There is much difference of opinion among the learned with respect to the persons here denominated *strangers*. Some suppose they were Jewish Christians; others, that they were in the first instance proselytes to Judaism, and then converts to Christianity; others again, that they were Christians in general. There are two considerations which induce us to hold that the first is the more probable opinion. The word *strangers* (Παρεπίδημοι) properly signifies persons from another country; and therefore it is very suitably applied to those Jewish believers who, in consequence of persecution in Judæa, were obliged to take refuge in distant provinces: and again, since the ministry of the circumcision was committed to St. Peter, it is more likely that he should address himself to his own converts than to Gentiles.

Another controversy has been agitated with respect to the place where the Epistle was written. In the concluding verses, it is implied that the Apostle was then at Babylon; but whether the word is used in a real sense to designate the city of that name, or mystically to signify Jerusalem or Rome, is the matter in debate. In all probability the term is employed for Rome; for the Jews were fond of using figurative appellations, especially in their national distresses. Edom was frequently a name for their heathen oppressors; and as Babylon was the cause of their first dispersion and captivity, it is not unlikely that Rome, the instrument of their second, and which so closely resembled Babylon in her 'abominations, idolatries, and persecutions of the saints,' should be denominated by the same title.

As St. Peter arrived in Rome, A.D. 63, and suffered martyrdom about 65, the Epistle may be dated in 64. It was written in a period of general calamity to the Church; and the design of the Apostle is to console and strengthen his converts in their trials, and teach them how to bear persecution. He exhorts them to honour and obey the civil authorities; and, above all things, to lead a holy and blameless life, that they might stop the mouths of their enemies and calumniators, and by their example gain over others to the side of Christianity.

The best critics speak highly of the excellence of this Epistle. One says it is sparing of words, but full of sense; another calls it majestic; and a third declares it one of the finest books in the New Testament, composed in a strain which demonstrates its divine authority. The writer displays a profound knowledge of the Gospel, and a deep conviction of the truth and certainty of its doctrines. Careless about the disposition of his words and the rounding of his periods, his heart is absorbed and his thoughts swell with the importance and grandeur of his subject. His style is vehement and fervid, and he speaks with the authority of the first man in the Apostolic college.

His second Epistle was written soon after the first. Its object is to confirm the instructions which he had formerly delivered, to establish his converts in the religion that they had embraced, to caution them against false teachers, to warn them against profane scoffers, and to prepare them for the future judgment of the world.

(Horne's *Introduction*; Macknight; Benson; Michaelis.)

PETER, ST., MARTYR. [Office, Holy.]

PETER OF BLOIS, better known by his Latinised name Petrus Blesensis (Blois being his birth-place), a writer of the twelfth century, who spent much of his life in England, being invited thither by King Henry II., who gave him the archdeaconry of Bath. There is a large volume of the writings of this Peter, consisting very much of letters, from which a far better account of his life might be collected than any which has yet been prepared. He was in great favour with Richard, who succeeded Becket in the archbishopric of Canterbury, and was his chancellor. He had also in England the archdeaconry of London, having resigned his archdeaconry of Bath. Peter was a scholar of John of Salisbury; and before he came to England he had studied at Paris and Bologna, and had been secretary to William II., king of Sicily. He died in England in 1200. The edition of his works by Pierre de Goussainville, folio, 1667, is accounted the best. His works belong to the series known as the Fathers of the Church.

Peter visited Bologna for the purpose of acquiring a knowledge of Roman law, and his letters contain numerous indications of his acquaintance with this subject. A work of his on canon law and process has lately been discovered, of which an account is given in the *Zeitschrift für Geschichtliche Rechtswissenschaft*, vol. vii., p. 207. (Savigny, *Geschichte des Römischen Rechts im Mittelalter*.)

PETER OF SICILY. [Sicilies, the Two, Kingdom of.]

PETER THE CRUEL, DON PEDRO I., son of Alonso XI., after his father's death succeeded to the united crown of Castile and Leon, A.D. 1350, being then only sixteen years of age. His first step was to put to death Leonora de Guzman, the mistress of his father, who had several children by her. His next proceeding was to command the city of Burgos to pay a certain tax without the sanction of the Cortes, but the people resisted and killed the collector. Upon this Pedro went to Burgos, accompanied by Don Juan de Albuquerque, his unprincipled councillor, and having summoned Garcilasso de la Vega, the adelantado of Castile, into his presence, ordered him to be instantly put to death by his ballasteros, or men-at-arms. In 1352, he assembled the Cortes at Valladolid, and endeavoured, but without success, to obtain the abolition of the Behetrias, which was the name given to the political condition of certain towns that had placed themselves under the protection of some powerful noble, and were in great measure independent of the crown. He next proceeded to Ciudad Rodrigo, where he had a conference with his maternal uncle, Alonso or Affonso IV., king of Portugal, who gave him the best advice as to the necessity of moderation, and above all as to adopting conciliatory measures towards his half-brothers, the sons of Donna Leonora, who possessed great influence in the country. Pedro listened to the advice, and he even invited the eldest of his natural brothers, Don Enrique, called Enrique of Transtamare, to his court, where another brother, Don Tello, already was. But his brothers did not trust him, and they soon left Pedro, rebelled, were defeated, and emigrated into Aragon. In 1253, by the advice of his ministers, Pedro solicited and obtained the hand of Blanche of Bourbon, a princess of the royal house of France. Pedro, who had a mistress, Maria de Padilla, behaved with coldness to his bride, and soon confined her in the fortress of Arevalo. He next conceived a passion for Donna Juana de Castro, a young lady of a noble family, and in order to marry her, he pretended, upon some grounds unknown to us, that his marriage with Blanche was null, and he found some prelates, the bishops of Salamanca and Avila, who took his part. In 1354, he publicly married Juana at Salamanca, but he soon abandoned her also, on the ground that he had deceived her as well as the prelates. Not long after Juana was brought to bed of a son. Her brother, Fernando Perez de Castro, a powerful lord of Galicia, incensed at his sister's treatment, raised the standard of revolt, and joined the king's brothers and other discontented nobles. Queen Blanche being rescued from her guards, the citizens of Toledo declared themselves her champions and defenders. The league thus formed became too powerful for Pedro, and on the interference of the pope's legate, the king promised to discard Maria de Padilla and to live with Blanche. On this condition the papal legate abstained from excommunicating him, but Pedro shortly after, having obtained supplies from the Cortes at Burgos, resumed the war, confined Blanche to the fortress of Siguenza, surprised the towns of Toledo and Toro, and put to death many of the leaders of the league; the rest escaped into Aragon. In 1358, Pedro having got into his possession his natural brother Fadrique, grand-master of the order of St. Iago, ordered him to be put to death by his guards in his own presence. Fadrique's brothers Enrique and Tello kept up a desultory warfare against Pedro on the borders of Aragon and Castile.

Pedro now entered into an agreement with his cousin and namesake, King Pedro of Portugal, for the mutual surrender of their respective subjects. Pedro of Portugal was nearly as cruel, though not quite so unprincipled as his cousin of Castile, and he was then busy in discovering and putting to death all those who had been any way concerned in the murder of his mistress Inez de Castro. [Alonso IV. of Portugal.] In 1360 the exchange of blood was made. The Castilian gave up the Portuguese emigrants, who were put to death, and he obtained the persons of several of his revolted subjects who had fled to Portugal, and whom he speedily despatched, except the archbishop of Toledo, the protector of Blanche, who was only banished. In 1361 that unhappy lady was put to death, it is said by poison, at Xeres, by order of her husband. Soon after, Maria de Padilla died a natural death, and Pedro, having assembled the Cortes at Seville, declared that she had been his lawful wife, and produced witnesses who swore to the nuptials as having taken place before his marriage with Blanche. The Cortes acknowledged the issue of Maria de Padilla to be legitimate.

It was about this time that Pedro committed another atrocious murder, on the person of Abu Saïd, the Moorish king of Granada, who had come to him at Seville with a safe conduct, [illegible] the purpose of doing homage for his kingdom as a fief of Castile. The Moor came with numerous attendants and servants in splendid attire, and brought much valuable property with him. He was invited by

Pedro to an entertainment, in the midst of which a number of armed men entered the hall, seized the Moors, rifled their persons, and dragged them to prison. The following day Abu Saïd, mounted on an ass, and thirty-seven of his companions, were paraded through the streets of Seville, preceded by a herald, who cried, that they were condemned to death by King Don Pedro for dethroning their lawful sovereign Mohammed Ben Yúsef. Being conducted to a field behind the Alcazar, Abu Saïd was stabbed to the heart by Pedro himself, whilst his companions were despatched by the Castilian guards, A.D. 1362. Abu Saïd was a usurper, but Pedro was not his judge. He had come to Seville on the faith of a king's promise, and on a friendly errand, and his murder was as unprovoked as it was cowardly. [MOORS, p. 389.]

The king of Aragon, joined by the king of Navarre, as well as by Bertrand Duguesclin and other French leaders and soldiers who resented the cruel treatment of Blanche, invaded Castile in 1366, entered Calahorra, and proclaimed Enrique, Pedro's natural brother, as king. Pedro, who was at Burgos, fled to Seville without fighting. Enrique was acknowledged throughout all Castile, and the people of Seville soon after revolted against Pedro, who fled into Portugal. From Portugal he went into Galicia, where he had some partisans, who urged him to try the fortune of arms; but Pedro, having already, in 1363, formed an alliance with Edward III. of England, depended chiefly upon the assistance of the Black Prince, who was then in Gascony. While passing through St. Iago he committed another deed of atrocity, the motive of which is not clearly ascertained. The archbishop of St. Iago, called Don Suero, was lord of several towns and fortresses, and he was one of those who had urged Pedro to make a stand against his enemies. All at once Pedro sent for him, and on the archbishop reaching the gate of his own cathedral, where the king stood as if to receive him, he and the dean were suddenly pierced by the spears of the guards, and the church was plundered. The strongholds of the archbishop were then occupied by the king's troops, after which Pedro embarked at Coruña, and sailed for Bayonne, A.D. 1366.

Edward the Black Prince engaged to restore Pedro to his throne. Pedro on his part promised him the lordship of Biscay, with a supply of money for himself and his army. Besides the alliance existing between his father and Pedro, the French king, Charles V., being the ally of Enrique, the English prince found it his interest to put his weight in the other side of the scale. In the spring of 1367 the Black Prince, together with Pedro, put themselves in motion with an army of English, Normans, and Gascons, and passing through the defile of Roncesvalles, they crossed Navarre, with the consent of that king, and entered Castile. The Black Prince was joined on his march by Sir Hugh de Calverley and Sir Robert Knowles, at the head of several thousand men, who had served as volunteers in the army of Enrique, but would not bear arms against their own countrymen. The army thus reinforced amounted to about 30,000 men. The army of Enrique was much superior in numbers, but the men were not all true to his cause. The two armies met at Najera, a few miles from the right bank of the Ebro, on the 3rd of April. The battle began with the war cry of 'Guienne and St. George' on one side, and Castile and St. Iago' on the other. Enrique fought bravely, but his brother Don Tello fled from the field at the head of the cavalry, and the Castilian infantry, being charged by the Black Prince in person, gave way. Enrique escaped with very few followers, and retired into Aragon. Pedro, whose ferocity had not been tamed by adversity, wished to kill the prisoners, but was prevented by the Black Prince as long as he remained in Castile. Pedro proceeded to Burgos, and all Castile acknowledged him again. But he behaved faithlessly to his ally; he only paid part of the money which he had promised for the troops, and as for the lordship of Biscay, Pedro excused himself by saying that he could not give it without the consent of the states of that province. The Black Prince, disgusted, and out of health, with his troops half starved, returned to Guienne, where he arrived in July. After his departure Pedro gave vent to his cruelty, and put to death many persons at Toledo, Cordova, and Seville. This gave rise to a second insurrection, and Enrique having again made his appearance, many of the towns of Castile declared for him. Some towns however, and Toledo among the rest, held out for Don Pedro, and a desultory but destructive warfare, as all Spanish wars have been, was carried on for two years. The circumstance of Pedro having still a strong party in many towns, notwithstanding all his cruelty, gives weight to the supposition that while Pedro ruled the nobles with an iron sceptre, he was not so obnoxious to the mass of the people, who were out of the reach of his capricious ferocity. Indeed it is said by Roderic Santius, that he was the scourge of the proud and turbulent, that he cleared the roads of robbers, and that he could be pleasing and affable when he liked.

In March, 1369, Enrique, being joined by Duguesclin with 600 lances from France, laid siege to the town of Montiél, where his brother then was. Pedro, through one of his knights, made great offers to Duguesclin if he would assist him to escape. Duguesclin informed Enrique of these offers, and it was agreed that he should entice Pedro to his tent. On the evening of the 23rd of March, Pedro came to Duguesclin's tent, when Enrique, who lay in wait, fell upon him with his dagger. They grappled together and fell to the ground, but Enrique soon despatched his brother. A Catalonian, quoted by Zurita, says that Enrique's attendants assisted him in overpowering Pedro. Bad as the latter was, there is no excuse for the treachery and foul manner in which he was killed. Enrique II. was then proclaimed throughout Castile.

(Dunham, *History of Spain and Portugal*, and authorities therein quoted; Froissart, *Chronique.*)

PETER THE FIRST, called the '**GREAT**,' Czar of Russia, was born at Moscow, on the 11th of June, 1672. His father, Alexis Michaelovitz, was twice married: by his first wife he had two sons and four daughters; and one son (the subject of this notice) and one daughter (Natalia Alexowna) by his second wife. The Czar Alexis was a man of a liberal mind; he commenced the work of improvement among his barbarous subjects, established manufactures, reduced the laws into a code, resisted the usurpations of the clergy, and invited foreign officers to discipline his armies. He died in 1677, and was succeeded by his eldest son Theodore, a youth of delicate constitution, who died in 1682, leaving no issue. The next brother, Ivan, was subject to epileptic fits, and of so weak intellect that Theodore named Peter as his successor. The princess Sophia, an ambitious woman, who had intended to reign herself, through the medium of her incompetent brother, being enraged at this appointment, engaged the strelitzes on her side, and fomented an insurrection, which was only appeased by Ivan being proclaimed joint sovereign with Peter, and Sophia as regent. Peter narrowly escaped with his life on this occasion, for, having fled with his mother to the Troitski convent near Moscow, at the commencement of the insurrection, he was pursued by some of the strelitzes, who found him before the altar, and were only deterred from striking a fatal blow by feelings of reverence or superstition. When Peter was seventeen, his party brought about a marriage between him and the daughter of the boyar Feodor Abrahamavitz, during the absence of Prince Galitzin, who had been associated by the Princess Sophia with her in the government. On the pregnancy of the Czarina being declared, Galitzin, whose plans were entirely deranged by this event, raised an insurrection, which however was soon suppressed, and Galitzin was banished to Archangel, and forfeited his estates. The Princess Sophia was confined to a convent for the rest of her life, which terminated in 1704.

From this time (1689) Peter reigned supreme; his brother Ivan never interfered, and died in 1696. Peter was now in the eighteenth year of his age. He was tall, stout, and well made; his features were regular, but indicated, when grave, a great degree of severity; at other times he was lively and sociable, and always full of energy and activity. His education had been much neglected, and it is said that the Princess Sophia had encouraged every species of excess by placing about him corrupt companions. Although there is no doubt that much of his time was passed in debauchery, yet it is a strong proof that a portion of it must have been devoted to better objects, that he immediately commenced the vast undertaking of reforming the whole system of government and the manners of the people, in which he had to encounter the jealousies of every class of his subjects, who looked upon these changes as subversive of their antient constitution. Peter's indomitable energy however overcame all obstacles. He first directed his attention to the army, in which department his plans were ably seconded by Generals Le Fort and Patrick Gordon, who, with other foreigners, had entered into his service. He himself entered the army as a private soldier, and rose through all the intermediate ranks before he obtained a commission. He caused all the young boyars to follow this example. He made the soldiers lay aside their long coats, shave their beards, and dress their hair, and in a very short time he had a corps of 5000 men disciplined and trained on the German plan. The sight of a small vessel built by some Dutchmen in his father's time, on the river which runs through Moscow, made a great impression on him, and he determined to have a navy. He hired Dutch and Venetian shipwrights, who built some small vessels at Pskov, in which he used to cruise on the Lake Peipus, until that becoming too confined a space for him, he went to Archangel, where he passed two summers cruising on board English and Dutch ships, and learning the duties of a practical seaman. His taste for everything connected with ships and navigation soon amounted to a passion. He resolved to be no longer dependent on foreigners for his ships, and accordingly sent a number of young Russians to Venice, Leghorn, and Holland, to learn the art of ship-building. By these measures his expenditure had been so much increased that it was necessary to take some steps towards augmenting the revenue, which he did, through the advice of his foreign councillors, by raising the custom-house duties from 5 to 10 per cent., which caused an increase of nearly 2,000,000 rubles in the first year. In 1696, he besieged and took Azoff. During the rejoicings which followed this first victory by the army and navy of his own creation, some of the discontented boyars and strelitzes conspired to put him to death, but, being betrayed by certain of the confederates, the plot was defeated by their arrest and execution.

Russia was not at this period represented at any of the courts of Europe, but Peter, being more than ever convinced of the pre-eminence of the inhabitants of Western Europe over his own barbarous subjects, resolved to visit these countries himself, and for this purpose he despatched an extraordinary embassy to Holland, accompanying it himself incognito. Before he set out on his travels in 1697, he took the precaution of leaving General Gordon, with 4000 of his guards, in Moscow, with orders to remain in that capital. He only took with him twelve attendants, among whom were his favourites, Menzikoff and Galitzin, and his dwarf, a necessary appendage to all great men in Russia. He went straight to Saardam in Holland, took a small lodging with two rooms and a garret, and a shed adjoining. He purchased carpenters' tools and the dress of the dockyard artificers, and there he and his companions spent almost all their time in working as common shipwrights. Peter went by the name of Pieter Timmerman; he rose early, boiled his own pot, and received wages for his labour. He was described by a native of Holland as being 'very tall and robust, quick, and nimble of foot, rapid in all his actions, his face plump and round, fierce in his look, having brown eyebrows and curling brown hair, and swinging his arms in walking.' He spent much time in sailing on the Zuyder Zee, and with his own hands made a bowsprit for his yacht; he also assisted at rope-making, sail-making, and smiths' work. A bar of iron which he forged at Olonetz some years later, with his own mark stamped upon it, is preserved in the Academy of Sciences at St. Petersburg. In the same spirit of inquiry and eagerness to learn, he visited every manufactory, examining into all the details of each. He attended the hospitals, where he learned to bleed and draw teeth; he was very fond of practising in a surgical way. From Holland he proceeded to England, when he arrived in January, 1698. As his chief object in coming to this country was to learn the theory of shipbuilding, and the method of making drafts, and laying them off in the mould-lofts, he did not disguise his annoyance at the crowds which assembled to see him, and at the festivities given in his honour.

The Marquis of Carmarthen was appointed by King William to attend upon the Czar, and they are reported to have passed their nights together in drinking pepper and brandy. Peter visited the dockyards of Deptford, Woolwich, and Chatham. He spent much of his time at Rotherhithe, where a ship was building for him. After his day's work, he and his companions were in the habit of retiring to a public-house near Tower-hill, to smoke and drink beer and brandy. The house still bears the sign of the Czar of Russia. He went to Portsmouth, to witness a grand naval review and sham fight. In April he quitted England, taking with him several men of science, engineers, and officers for his army and navy. He spent a short time in Holland, and then proceeded to Vienna to make himself acquainted with the dress, discipline, and tactics of the emperor's army, then considered the best in Europe. From thence he was preparing to visit Italy, when he received news of a rebellion having broken out among the strelitzes, fomented, it was said, by the priests and the Princess Sophia. His prudence in leaving General Gordon in Moscow was now made manifest. That officer entirely defeated the rebels, many of whom lost their lives and others were thrown into prison to await the return of the Czar. Peter quitted Vienna immediately on the receipt of this intelligence, and arrived at Moscow, after an absence of seventeen months.

The dark side of Peter's character now showed itself in the savage nature of the punishments inflicted on the rebels; in palliation of which it can only be said that this being the third insurrection during his reign, a severe example was required to deter other malcontents. He next ordained that all persons, civil as well as military, should cut off the skirts of their Tartar coats, and shave their beards: a tax was levied on all who disobeyed, which, from the love of the Russians for these appendages, became a fruitful source of revenue. He regulated the printing-press, and caused translations to be published of works on various arts and other subjects, established schools for the marine and the teaching of languages, obliged his subjects to trade with other countries, which formerly subjected them to the penalty of death, and he altered the calendar, much to the horror of the priests, ordering that the year 1700 should commence on the 1st of January, instead of the 1st of September, which day used to commence the Russian year. He also instituted the order of St. Andrew, the patron saint of Russia.

In the year 1700 Peter entered into an offensive league with Poland and Denmark against Sweden. His army was defeated before Narva by Charles XII., on the 19th of November in that year; but far from being dispirited at this event, he was only excited to renewed exertion, and he observed that the Swedes would at length teach his soldiers to beat them. In 1703 he laid the foundation of St. Petersburg; and in the previous year the Russian army, under Scherematoff, had gained a complete victory over an inferior force of Swedes, and immediately after took the town of Marienburg. The war continued with more or less success until the year 1709, when Charles XII., having rashly marched into the Ukraine, was completely defeated by the Russian army under Peter at Pultowa, on the 15th of June. Charles himself escaped to Bender, but his army was totally annihilated.

We have seen that Peter, in his seventeenth year, had a wife forced upon him, who bore him one son, Alexis. The czarina having encouraged the factious party, who opposed all innovation, Peter found it necessary to divorce and confine her to a convent before he had been married three years (1696). His son Alexis was unfortunately left in her guardianship. When the prisoners taken at Marienburg filed off before General Bauer, he was much struck with the appearance of a very young girl, who appeared to be in the greatest distress. She had been married only the day before to a Livonian sergeant in the Swedish service, whose loss she was then mourning. The general took compassion on her, and received her into his house. Some time after, Menzikoff being struck by her beauty, she was transferred to him, and remained his mistress till the year 1704, when, in the seventeenth year of her age, she became the mistress of Peter, and gained his affections so entirely that he married her, first privately and afterwards publicly. On the 17th of March, 1711, he declared the czarina Catherine Alexina his lawful wife. She accompanied her husband immediately afterwards to the war in Turkey, which had just broken out. Peter, following the rash example of Charles XII., entered the enemy's country before his whole army was concentrated. Without sufficient force to keep up his line of communication with Russia, he crossed the river Pruth near Jassy, marched some way down the right bank, and was hemmed in by the army of the grand-vizier on one side, and the Tartars of the Crimea on the opposite shore of the river. After three days' action, the situation of the army became desperate, when Catherine, unknown to her husband, sent a letter to the grand-vizier, with a present of all the plate and jewels she could collect in the camp. After some delay a treaty of peace was signed, by which Peter gave up the towns of Azof and Taganrog, and the vizier supplied the Russian army with provisions. Peter's health was so much impaired after this campaign, that he went to Carlsbad to drink the waters. From Carlsbad he proceeded to Dresden, where his son the czarovitz Alexis Petrovitz was married to the princess of Wolfenbuttel. From Dresden he went to St. Petersburg, where he solemnised anew his marriage with Catherine with great pomp. Peter now determined to strip Sweden of every place which could be an annoyance to his new capital. Before the close of 1713 Stralsund was the only spot in Pomerania remaining to the Swedes: Peter himself gave the plan for its siege, and then leaving Menzikoff to carry it out, went to St. Petersburg, and from thence with a squadron of galleys and flat boats made himself master of Abo and the whole coast of Finnland. The library of Abo was transferred to St. Petersburg, and was the foundation of the present library of that city.

He next defeated the Swedish fleet in a naval engagement, and instituted the female order of St. Catherine on the occasion, in honour of the czarina, who alone could bestow it. The senate was removed from Moscow to St. Petersburg in 1713, and the emperor's summer and winter palaces were completed in 1715. He employed about 40,000 men in finishing his dockyard, building ships, wharfs, and fortifications. Goods imported into Archangel were prohibited from being sent to Moscow; and under these favourable circumstances, St. Petersburg soon became a place of great commerce and wealth.

Peter had now taken the whole of Finnland, and the provinces of Esthonia and Livonia, and having nothing to fear from Charles XII., he made a second tour through Europe in 1716, accompanied by the empress. They visited Mecklenburg, Hamburg, Pyrmont, Schwerin, Rostock, and Copenhagen, where he remained some months. While he was at Copenhagen, an English and a Dutch squadron arrived: Peter proposed that the four fleets should unite, and proceed to sea in search of the Swedish fleet: the chief command was given to the Czar, who declared the moment in which he hoisted his standard to be the proudest of his life. From Copenhagen he went to Lübeck, where he had an interview with the king of Prussia, and then to Amsterdam, where he remained some time. Catherine, who had been left behind, was brought to bed at Wesel of a third child, which died the next day. She remained at Amsterdam while her husband went to Paris, where he was received with great splendour. On his return to Amsterdam he visited Berlin on his way to Russia. During this tour he purchased great quantities of pictures, cabinets of birds and insects, books, and whatever appeared likely to enrich or ornament the city of his creation. The king of Denmark presented him with a great hollow globe eleven feet in diameter, whose inside represented the celestial and the outside the terrestrial sphere. Peter showed everywhere the same dislike to parade and formal etiquette which he had always evinced, and avoided them when possible.

His eldest son, Alexis, who had unhappily been left to the guardianship of his mother, had always been a source of disquietude and trouble to Peter; and when he grew up, far from showing any desire to tread in the footsteps of his father, he chose his friends and advisers from among the disaffected and turbulent boyars and priests, who were opposed to all change. The unfortunate princess, wife of Alexis, had fallen a victim to the brutal conduct of her husband, after giving birth to a son, Peter Alexiovitz, afterwards Peter II. While yet grieving for the loss of his daughter-in-law, Peter remonstrated with his son on his conduct, and told him that he should not be his successor unless he altered his mode of living. These remonstrances being treated with complete neglect by Alexis, who still pursued his vicious courses, Peter forced him, on the 14th Feb., 1718, to sign and swear to a deed wholly renouncing the succession to the crown: he also required from him the names of his advisers in his misconduct. The answers given by Alexis to the queries put to him were such, that Peter thought it necessary to try him by the great officers of state, the judges, and the bishops, who unanimously condemned him to death. On the day of his condemnation, he was seized with a violent illness, which terminated in two days, on the 7th July, 1718. His mother was strictly confined, and his advisers punished. In 1719 the Czar's son by Catherine, in whose favour Alexis had abdicated, died at five years of age. On the 10th September, 1721, the peace of Neustadt was concluded, by which Sweden ceded to Russia, Livonia, Esthonia, Ingria, Carelia, Wyburg, and the adjacent islands, but secured the possession of the Gulf of Finland.

Peter had now attained the summit of his glory: he was requested, and after some hesitation consented, to adopt the titles of 'Peter the Great, Emperor of all the Russias, and Father of his Country.' This was done amidst great rejoicings, which continued for fifteen days. He now turned his undivided attention to the arts of peace. He commenced canals to unite navigable rivers; encouraged by bounties the manufactures of woollen and linen cloths; the erection of corn, powder, and sawing mills; established a manufactory of small-arms; instituted hospitals, and established a uniformity of weights and measures; paved the streets of Moscow and St. Petersburg; and ordered the young nobility to carry their wives to visit foreign courts and countries, in order to acquire more civilised manners. Some of his measures were not so politic, although equally well intended, such as the attempt to fix the prices of provisions and the limit of expense in dress.

In 1722, Peter led an expedition to the Caspian, which however failed in producing any results. In 1723 he went to St. Petersburg to found the Academy of Sciences, and to erect a memorial of the establishment of a navy in Russia. Peter took his idea of the academy from that of Paris, of which he had been elected a member during his visit to that capital. In the same year he caused Catherine to be crowned, and his eldest daughter was married to the duke of Holstein Gottorp. He suffered greatly at this time from a strangury in the neck of his bladder, which painful disorder he endeavoured to stifle by an unlimited indulgence in strong liquors, which so much increased the violence of his temper, that even the empress is said to have feared his presence. Being partially relieved, he went, in October, 1724, contrary to the advice of his physicians, to inspect the works on Lake Ladoga. On his return he proceeded to Lachta, on the Gulf of Finnland, and had scarcely anchored there, when a boat full of soldiers being cast on the shore, Peter, in his ardour to assist them, waded through the water, which brought on violent inflammation in the bladder and intestines. He was conveyed to St. Petersburg, where his complaint made rapid progress, giving him intense and constant pain. He at length sunk under the disease, and expired on the 28th of January, 1725. His body lay in state till the 21st March, when his obsequies and those of his third daughter, Natalia Petrowna, who died after her father, were performed at the same time.

Peter I., deservedly named the Great, was compounded of contradictions; the greatest undertakings and the most ludicrous were mingled together; benevolence and humanity were as conspicuous in him as a total disregard of human life; he was at once kind-hearted and severe even to ferocity; without education himself, he promoted arts, science, and literature. 'He gave a polish,' says Voltaire, 'to his people, and was himself a savage; he taught them the art of war, of which he was himself ignorant; from the sight of a small boat on the river Moskwa he created a powerful fleet, made himself an expert and active shipwright, sailor, pilot, and commander; he changed the manners, customs, and laws of the Russians, and lives in their memory as the *Father of his Country*.'

Menzikoff, whose birth was so obscure as to be totally unknown, and who had risen through the favour of the Czar to be a prince and governor of St. Petersburg, caused Catherine to be proclaimed empress immediately after the death of Peter, and during her reign possessed unlimited power. Catherine died of a cancer in the breast, aggravated by excessive indulgence in wine of Tokay, in 1727, at the age of 38, having survived her husband only two years and a few months. She was succeeded by Peter II., son of the unfortunate Alexis. He was left in the guardianship of Menzikoff, who affianced his daughter to the young Czar. Peter felt the greatest repugnance to her, and in consequence, with the help of Dolgorouki, his tutor, caused Menzikoff to be arrested and banished to Siberia. His great wealth was forfeited, and he was only allowed out of it 10 rubles a-day for his support. He died at Berezof, in 1729. The haughty favourite of Peter the Great, whose magnificence exceeded that of crowned heads, died in poverty and exile.

Among other works connected with the mechanical arts, Peter the Great translated 'L'Architecture de Sebastien Leclerc;' 'L'Art de Tourner, par Plumier;' 'L'Art des Ecluses et des Moulins, par Sturm.' The manuscripts of these, with his journal of the Swedish campaigns from 1698 to 1714, are preserved at St. Petersburg.

(Voltaire; General Gordon, *Hist. of Peter the Great; Mem. of Peter Bruce;* Coxe's *Travels; Biograph. Universelle.*)

PETER II. [Russia.]

PETER III. [Russia; Catharina ii.]

PETER THE HERMIT. [Crusades.]

PETER-HOUSE, the earliest endowed college in the university of Cambridge, was founded in 1257, by Hugh de Balsham, then sub-prior, afterwards bishop of Ely, who, having purchased two hostels, one of them belonging to the Friars of Penance, united them, and appropriated the building for the residence of students; but it was not till 1280, after his promotion to the see of Ely, that he endowed the college with revenues for the support of a master, fourteen fellows, two bible-clerks, and eight poor scholars. After his death a new college was built on the site of the two hostels, for which purpose the bishop gave by will the sum of three hundred marks; he gave them also the church of St. Peter. Among the principal benefactors in subsequent times were Simon Langham, bishop of Ely, who gave the rectory of Cherry-Hinton; bishop Montacute, who appropriated the church of Triplow, and gave the manor of Chewell in Haddenham; Margaret lady Ramsay, who founded two fellowships and two scholarships, and gave two advowsons; and Dr. Hale, one of the masters, who gave the sum of 7000*l.* and two rectories.

The fellowships are open without restriction to natives of any part of the British dominions, but no one is eligible who is M.A., or of sufficient standing to take that degree. The bishop of Ely appoints to the mastership one of two candidates presented to him by the society. The candidates must be doctors or bachelors of divinity, and must be selected if possible from the fellows on the foundation. Formerly there could not be more than two fellows of a county (except of Cambridge or Middlesex), and seven fellowships were confined to the northern and seven to the southern division of England and Wales; but these restrictions were removed by letters-patent, which came into operation in June, 1839.

One-fourth part only of the foundation fellows are required to be in priest's orders. By queen Elizabeth's licence the five senior clerical fellows may hold any livings with their fellowships, provided they are not more than 20*l.* in the *Liber Regis*, and within twenty miles of the university of Cambridge. The bye fellowships, which are perfectly open and unrestricted, are distinct from the former; the possessors of them are not entitled to any office or voice in the affairs of the college. Two were founded 1589, by Andrew Perne, D.D.; two, in 1601, by Lady Ramsay; and four, in 1637, by Thomas Parke, Esq.

Two fellowships of 70*l.* per annum each, and four new scholarships of 30*l.* per annum each, have recently been added to the college from the donation of the Rev. Francis Gisborne, M.A., late fellow of Peter-House. This foundation bears the name of the donor. The two Gisborne fellowships are tenable for seven years, and any person may be elected from either of them into a foundation fellowship before he is of standing to take his M.A. degree. These fellowships are vacated by marriage, or by the possession of any permanent income amounting to 250*l.* per annum.

The rest of the scholarships, fifty-eight in number, of different value, are paid in proportion to residence. A few of them are in the patronage of Lord Melbourne, and preference is given to scholars of Hertford school.

The livings in the gift of this college are, the rectories of Glayston in Rutlandshire, Statherne in Leicestershire, Exford in Somersetshire; Norton, Witnesham, Newton, and Freckenham, in Suffolk; and Knapton in Norfolk; with the vicarage of Hinton, and the curacy of Little St. Mary, Cambridge, in Cambridgeshire; and the vicarage of Ellington in Huntingdonshire. Glayston rectory is annexed to the mastership, and the vicarage of Hinton and the curacy of Little St. Mary are tenable with fellowships.

This college stands on the west side of Trumpington-street, and consists of two courts, the larger of which is 144 feet by 84. The chapel, which stands in the lesser court, was built in 1632. The master's lodge is a detached building on the opposite side of Trumpington-street.

The bishop of Ely is the visitor of this college. The number of members upon the boards, March 18th, 1840, was 210. Copies of the statutes of this college are preserved among the Harleian MSS. in the British Museum.

(Lysons's *Magna Britann.*, 'Cambr.,' pp. 103, 104; *Camb. Univ. Calendar*, 1840.)

PETER PENCE, a tax antiently levied throughout England, according to some authorities, of a penny upon each house; according to others, of a penny upon every house which contained twenty pennyworth of any kind of goods, and paid to the pope. This payment, in antient times, passed under various denominations: Rome-fee, Rome-penning, and Rome-scot were the Saxon names; Denarii S. Petri and Census S. Petri, in Latin. The earliest payment of it is attributed by some to Ina, king of the West Saxons, A.D. 720; by others to Offa, king of Mercia, A.D. 790. At one period of his reign, Edward III. discontinued this payment, but it was revived by Richard II. It finally ceased at the Reformation. (Du Cange's *Glossary; Hist. Will. Malmsb. Leg. Edw. Conf. & Will. Conq.*)

PETER'S RIVER, ST. [Mississippi, River.]

PETER'S, ST. [Rome.]

PETERBOROUGH, or **PETERBURGH,** an English city, in the liberty of Peterborough (otherwise called Nassburgh or Nassaburgh soke or hundred), in the county of Northampton, on the river Nene, and on the Hull and Lincoln mail road, 83 miles from the General Post-office, London, by Waltham Cross and Baldock.

This city owes its origin to a celebrated Benedictine abbey founded by Peada, son of Penda, king of the Mercians, soon after the revival of Christianity among the Saxons. Peterborough was antiently called Medeshamsted and Medeswellehamsted. About the year 870 the abbey was destroyed by the Danes; and after remaining desolate for a century, was restored in the reign of Edgar (A.D. 970), about which time the name Medeshamsted was superseded by that of Burgh, otherwise Gilden-burgh, from the wealth and splendour of the abbey, or Peter-burgh, from the saint to whom it was dedicated. In the reign of William the Conqueror the abbey was attacked and plundered by the insurgents of the fens under Hereward-le-Wake; and the village which was rising around it was destroyed by fire. In 1116 the village and the greater part of the abbey were again destroyed by fire. The monastic buildings were gradually restored and augmented; and at the dissolution of the religious houses under Henry VIII., Peterborough was one of the most magnificent abbeys then existing. Having been selected as the seat of one of the new bishoprics erected by Henry, the buildings were preserved entire. In the civil war of Charles I. great devastations were committed. The cathedral itself was much injured, and many of the other conventual buildings were utterly demolished and the materials sold. The Lady-chapel was subsequently taken down by the townsmen, to whom the church had been granted for a parish church. No historical interest is attached to the town independent of the abbey or cathedral.

Peterborough is comprehended in the parish of St. John Baptist, which has a total area of 4880 acres, and a population, in 1831, of 6313: of this the limits of the city comprehend an area of 1430 acres, and a population of 5553; the remaining area and population are included in the hamlets of Dogsthorpe and Eastfield with Newark, and the chapelry of Longthorpe. The city consists of several streets regularly laid out and well paved and lighted, close upon the bank of the river, over which there is a wooden bridge. The houses are in general well built, and several of them are of recent erection. Besides the cathedral, there is a large parish church; and also some dissenting places of worship. There is a market-house, the upper part of which is used as the town-hall; and a small gaol and house of correction for the liberty.

The cathedral of Peterborough is a regular cruciform structure of Norman or early English character, remarkable for the solidity and massiveness of its construction. The erection of it was commenced A.D. 1117 (after the great fire of 1116), by John de Sais or Seez, a Norman, then abbot. It is probable that the choir was the part first erected. It has a semicircular eastern end, and at the extremities of the semicircle there are two slender turrets crowned with pinnacles: the aisles have subsequently been carried out square by an addition of perpendicular character. The chancel was finished (A.D. 1140) by Abbot Martin de Vecti: the great transept and a portion of the central tower were built by Abbot William de Waterville or Vaudeville (A.D. 1160-1175), and the nave by Abbot Benedict (A.D. 1177-1193). The central tower is low, and forms a lantern. The nave has its piers composed of shafts of good proportions and fine appearance, without that overwhelming heaviness which appears in buildings where the great circular piers are used. At the western end of the nave are smaller transepts: over the north-western transept is a tower of early English character, with angular buttresses surmounted with pinnacles, and formerly with a spire. It was obviously part of the architect's plan to erect a similar tower over the south-western transept, but it was never completed. The fine western front of the cathedral is an addition to the nave; it consists of a lofty portico of three compartments, that in the centre being the narrowest; each compartment has an arch equal in height to the nave, supported by triangular piers faced with clustered shafts, and is surmounted by a lofty and richly ornamented pediment and a cross. At each extremity of the western front is a lofty turret flanked at the angles by clustered shafts and pinnacles, and crowned with spires. The fine effect of this western front is much injured by a small porch or chapel inserted in the central arch between the piers, which, though in itself very beautiful, is here quite misplaced.

Though the general character of the architecture is Norman or early English, great alterations have been made in later styles. Nearly all the windows have had tracery inserted, and some of them have been enlarged. The perpendicular addition at the eastern end, by which the aisles of the choir have been carried out square, is plain in its outward appearance, with large windows and bold buttresses, the latter surmounted by sitting statues in place of pinnacles. The ceiling or inner roof of the nave and of the great transepts is painted wood; and the choir has a wooden groined roof of very inferior workmanship and appearance. The dean and chapter have recently erected a new organ-screen of stone, and entirely new fitted up the choir with stalls, throne, pulpit, and altar-screen. The organ-screen consists of an entrance into the choir under a richly moulded pointed arch surmounted by a crocketed canopy. The whole of the fitting up of the choir is in the style of the time of Edward III., and the wood-work is of oak richly ornamented. There are few monuments, shrines, or chantry chapels, the devastations of the parliamentary troops having deprived the church of many of its ornaments of this class. The burial-places of the two queens, Catherine of Aragon and Mary of Scotland, both of whom were interred here, are unmarked by any sepulchral monument.

The dimensions of the church are given by Bridges (*Hist. of Northamptonshire*) as follows:—total length 476 ft. 5 in., breadth of the nave and aisles 78 ft., height of the ceiling of the church 78 ft., breadth of the church at the great transepts 203 ft., breadth of the transepts 69 ft., height of lantern 135 ft.; all these are (we believe) inside measurements. Length of the western front 156 ft., height of the turrets at the extremities of the west front 156 ft., tower and spire (the latter since taken down) over the north-west transept from the ground, 184 ft., height of the central tower from the ground 150 ft.; these are all outside measurements.

The view of the cathedral is confined on every side except the west, at which end is a large court, the entry to which from the town is by a gateway of Norman architecture, with some later additions. On the south side of the court is a range of the antient monastic buildings, retaining much of their antient appearance, and having in the midst of them the tower-gateway to the bishop's palace, over which is the knight's chamber. On the greater part of the other sides the cathedral is surrounded by the antient cemetery of the citizens, which is filled with tombstones. The gate of entrance to this cemetery from the western court is by a late perpendicular gate, remarkably rich in ornament. This cemetery is now not used; and a new burial-ground has been formed on the western side of the city.

The trade carried on at Peterborough is chiefly in corn, coal, timber, lime, bricks, and stone. The Nene is navigable for boats. There is a weekly market, and there are two yearly fairs; one of these, called 'Brigge fair,' is kept over the bridge on the Huntingdonshire side of the river.

There is no corporation at Peterborough. The dean and chapter exercise a certain jurisdiction; their steward holds a court for trying all actions, personal or mixed, arising within the city, but suits above 5*l.* are seldom tried here. The writs issuing from this court are directed to the bailiff of the city, who is appointed by the dean and chapter. Quarter-sessions for the liberty of Peterborough (which includes the whole soke or hundred of Nassaburgh) are held for trying criminal actions of all kinds; the *Custos Rotulorum*, who is appointed by the crown, presides. The gaol and house of correction for the city and liberty are both miserably deficient. (*First Report of Inspectors of Prisons in Great Britain.*) Prisoners committed for trial for capital offences are sent to Northampton.

Peterborough has sent members to parliament from 1 Edw. VI. (A.D. 1647). The boundary of the city for parliamentary purposes was enlarged by the Boundary Act, so as to comprehend the whole parish of St. John the Baptist and the Minster precincts, which are extra-parochial. The bailiff of the city is the returning-officer. The number of voters registered in 1835-36 was 578.

The living of St. John is a vicarage including the chapelry of Longthorpe, of the clear yearly value of 575*l.*, with a glebe-house. It is in the gift of the bishop of Peterborough.

There were in the parish, in 1833, one infant-school, with 68 children; the endowed cathedral grammar-school, with 31 boys; two endowed schools, with 20 and 16 boys respectively; a national school, with 322 boys and 118 girls, thirteen other boarding or day schools, with 182 boys and 190 girls; and two Sunday-schools, with 93 boys and 91 girls.

The bishopric of Peterborough was erected by Henry VIII.; the diocese, which was taken out of that of Lincoln, comprehends the counties of Northampton and Rutland, except three parishes in each county, which remain in the peculiar jurisdiction of Lincoln. There are two archdeaconries, Northampton and Leicester: that of Northampton comprehends the ten rural deaneries of Brackley, Daventry, Haddon, Higham Ferrars, Northampton, Oundle, Peterborough, Preston, Rothwell, and Weldon, all in Northamptonshire; the five rural deaneries of Alstow, East Hundred, Oakham soke, Rutland or Martinsley, and Wrandike, all in Rutlandshire; the archdeaconry of Leicester (lately in the diocese of Lincoln) contains the seven rural deaneries of Akeley, Framland, Gartree, Goodlaxton, Goscot, Leicester, and Sparkenhoe.

The average yearly revenue of the bishopric is returned at 3518*l.* gross, and 3103*l.* net, including the preferments annexed to the see. The average yearly revenue of the cathedral is returned at 6357*l.* gross, and 5118*l.* net. The corporation consists of the dean and six prebendaries; there are four minor canons, and a precentor, who is also sacrist and librarian. The dignitaries have no separate revenues.

PETERBOROUGH, LORD. [MORDAUNT.]

PETERS, BONAVENTURA, one of the most eminent marine painters of the Low Countries, was born at Antwerp in 1614. The subjects which he in general preferred were storms at sea, 'in which,' says Pilkington, 'he represented with extraordinary truth and pathos the various circumstances that can fill the mind with pity and terror. The raging of the waves, the impending tempest, vessels foundering or dashed in pieces against rocks, the mariners perishing in the deep, or seeming to dread a lingering death on a desert shore, are expressed by his pencil with the utmost truth, nature, and probability.' Sometimes however he painted calms and views of castles, or towns on the sea-shore, with equal merit. There is the same light and spirited touch, the same transparency in his colouring, and his water, whether agitated or still, has equal truth and delicacy. The figures are extremely well designed and exquisitely finished. In a few of his works (which perhaps are erroneously ascribed to him) the colouring is too coarse, and the draperies of the figures mingled with tints that do not harmonise with the whole. His best works are extremely valuable and scarce, for he died, in 1652, at the early age of thirty-eight years.

Peters, John, brother of Bonaventura, was born at Antwerp, in 1625. He painted the same subjects as his brother, which are as finely touched, as well coloured, as transparent, and enriched with excellent figures. His sea-fights were much admired; and he also painted views of villages, towns, and fortresses on the banks of rivers, which he designed after nature.

PETERSBURG, ST., a government of European Russia, extends from 57° 56′ to 60° 35′ N. lat. and from 21° 5′ to 33° 52′ E. long. It is formed of the antient province of Ingermannland, or Ingria, a part of Carelia, and some circles formerly belonging to Novogorod. It is bounded on the north by the Gulf of Finnland, Finnland, and Lake Ladoga; on the east by Novogorod; on the south by Pskow; and on the west by Lake Peipus and Esthonia.

Face of the Country; Soil; Climate.—The country is for the most part level, and in the north-east part it is low, and full of swamps and morasses. In the south it is rather more elevated; a long range, called the Duderhoff mountains, which in fact are only low hills, nowhere rising more than 240 or 300 feet above the level of the sea, covers this part of the country. The government contains many forests, and only here and there some good arable land. The soil in the eastern, southern, and western circles, even on the Gulf of Finnland, is partly sandy, partly clayey, with extensive morasses and forests, which, together with the lakes, cover two-thirds of the surface. The principal lakes are the Ladoga, Peipus, and Pskow: and the chief rivers are the Neva, the Luga, the Narova, and the Wolchow. The Neva issues from Lake Ladoga, near the fortress of Schlusselburg, from which point to its mouth is only 40 wersts in a straight line, but owing to the bend which it makes towards the south, the whole course is 60 wersts (40 English miles) to the bay of Cronstadt, which ought to be considered as the mouth of the river, for the water is sweet and fit for drinking as far as Cronstadt. The banks are rather elevated; the breadth varies from 600 to 1200 feet, and the water is remarkably pure, light, and limpid. Within the city of St. Petersburg it divides into several branches. The climate is cold, damp, and not favourable to agriculture. The summer is short, but in general fine and often very hot: thunder-storms are neither frequent nor violent. The area of the government, according to Schubert, who is followed by Storch, Wichmann, and others, is 17,800 square miles; Arsenieff makes it 16,400, Köppen 18,500, and Hörschelmann 18,600. It is divided into nine circles. The population, in 1838, was 890,000. Though the climate is so unfavourable, and a large portion of the government covered with marshes, the crops raised are by no means scanty, though they are not sufficient for the supply of the great population of the capital. Flax and hemp are not much cultivated; fruit-trees do not thrive in the open air. There are however in the vicinity of St. Petersburg fine gardens and parks; kitchen-gardens, which produce vegetables in abundance, and numerous hothouses which supply the capital with pines, melons, pine-apples, asparagus, &c. Timber is still the chief source of wealth, for the forests, though much injured by waste and bad management, are still of immense extent. In the forests vast quantities of berries, wild fruits, and mushrooms are found. There is no game except hares. The country-people rear great numbers of geese, ducks, and turkeys for the markets of St. Petersburg. Fish are tolerably abundant. The breeding of cattle is very limited on account of the cold. The mineral kingdom affords granite, limestone, marl, brick earth, potters' clay, &c. The villagers manufacture wooden wares of various kinds. Trade and manufactures are almost wholly confined to the capital: there are however considerable manufactories of cloth, camlet, and blankets, as well as several glass-houses at Jamburg, on the Luga, with 2000 inhabitants; and of printed calico at Schlusselburg, on an island where the Neva issues from Lake Ladoga. Gatschina, situated on a beautiful lake formed by the Ischora, has 7000 inhabitants, a military orphan-house, and a foundling hospital. [NARVA; CRONSTADT.]

PETERSBURG, ST., the second capital of the Russian empire (Moscow being accounted the first), is situated in 59° 56′ N. lat. and 30° 18′ E. long., at the eastern extremity of the Gulf of Finnland, and at the mouth of the river Neva. Of all the capital cities of Europe, St. Petersburg has at first sight the most striking appearance: the breadth and cleanliness of the streets, the elegance of the buildings, the noble canals which traverse the city, and the regularity of the edifices on their banks, make altogether a most impressive spectacle. 'The united magnificence of all the cities of Europe,' says Dr. E. Clarke (since whose time it has been very much improved), 'could but equal St. Petersburg.' There is nothing little or mean to offend the eye; all is grand, extensive, large, and open; the streets seem to consist entirely of palaces; the edifices are lofty and elegant. The public structures, quays, piers, ramparts, &c., are all composed of masses of solid granite, and our admiration is increased when we reflect that not a century and a half has elapsed since its foundation. In 1703 Peter the Great chose this spot, then just taken from the Swedes, for the site of a fortified seaport. It was a low marshy island, covered in summer with mud, and in winter a frozen pool. The adjacent country was covered with marshes and impenetrable forests, the haunts of bears and wolves. We cannot suppose that Peter had any idea of fixing the seat of his empire on this extreme frontier, but it was important to have a strong position as a check upon the Swedes: this was also the only place through which an intercourse could be established with civilised Europe, an object which he had much at heart. In fact he was probably aware that the fort which the Swedes had built about five miles from the mouth of the Neva, at the place where it receives the little river Ochta, and which they called Nyenschanz, besides its importance as a military station, and as the key of the country, was not less important as a commercial place, during the connection of Novogorod with the Hanseatic league, especially in the sixteenth century. Under Alexis Michailovitsch the fort and the town were almost wholly destroyed by fire, and Nyenschanz was only a good military position, but an insignificant town when Peter the Great made himself master of it in 1702, after a few days' siege. The habitations supplied materials for the houses of St. Petersburg.

The Neva, on the banks and islands of which the city is built, runs first towards the north, and then turning to the west, sends out towards the north an arm called the Nevka, which again divides into two branches called the Great and the Little Nevka. The main river, after throwing out the Nevka, divides into two branches, the Little Neva, which runs north-west, and the Great Neva, which runs south-west. Thus the Gulf of Cronstadt receives the Neva by four great arms, which form several islands. The island to which the name of St. Petersburg was first given, lies on the north side of the river between the Nevka and the Little Neva; and on a small island in the Great Neva, between these two arms, Peter laid the foundations of a fortress, which however was not completed till 1740. The difficulties to be overcome were immense. In the spring of 1703 he collected a number of Russian, Tartar, Cossack, Calmuck, Finnish, and other peasants, and workmen were sent for from all parts of the empire. Peace not being yet concluded, soldiers were encamped on both sides of the Neva. The great difficulty was to find subsistence for so many persons. The surrounding country was desolated by a long war, and provisions were very scarce and dear. The workmen, being exposed to the cold and the damp, often up to their shoulders in the water, perished from fatigue and want, and the foundation of St. Petersburg cost the lives of one hundred thousand men.

The city, in its present state, is of a circular form, but rather irregular. The circuit is about eighteen miles, but the smaller portion of the area is covered with buildings. The most considerable and the handsomest portion is the southern, on the left bank of the Neva, including the four Admiralty quarters; between this and the northern or right bank of the Great Nevka, lie, from south to north, 1, Wassily-Ostrov; 2, St. Peter's Island, the Island of Petrovsky, and the Apothecaries' Island; 3, Kammenoi-Ostrov, Krestovsky, and Yelagin, a group of islands covered with gardens, groves, avenues of trees, and country-houses, which in summer are the resort of the rich. The city is divided into twelve districts, and these again into quarters. Few cities have such long and broad streets as St. Petersburg. They are from 60 to 120 feet broad; and the Nevsky Perspective is 14,350 feet long, the Great Perspective 10,220, and eight others 6000. The stone pavement is in general bad, and must be laid down afresh every year; a pavement of hexagonal blocks of wood, covered with tar, has been found to be more durable and cheaper, and is now used in many of the principal streets, which have broad flag-pavement for the foot passengers. There are no wells, but the water of the Neva is remarkably clear, pure, and wholesome. Those who live at a distance from the river use the water of the canals, the principal of which are the Fontanka, surrounding the whole Admiralty quarter, and, within it, the Catherine Canal and the Moika. There are two bridges of boats over the Neva, and three over its arms; one of them, the Troitskoi or Suwaroff Bridge, is 2456 feet long. These bridges are all removed whenever danger is apprehended from the ice, both at the beginning of the winter and in the spring. There are above seventy bridges over the canals, many of which are of granite, and ten of cast-iron, two of which are handsome suspension bridges, and many of wood. The Great or Southern Neva is here from 900 to 1200 feet wide, and its south or left bank, to the extent of 10,000 feet, exclusive of the Admiralty, which divides it into two parts, is furnished with a quay of granite, a work which, for utility and magnificence, will remain a lasting monument of the reign of Catherine II. The bank is raised on piles ten feet above the level of the water, and has a foot-pavement seven feet broad, a breastwork two feet and a half high, and, at convenient distances, double flights of steps for landing, with semicircular seats at the top, all of granite. The part of the quay to the east of the Admiralty is called the Quay of the Court, and that on the west 'The English Quay,' being lined with a row of houses chiefly inhabited by opulent English merchants. The Quay of Wassily-Ostrov, on the opposite bank, which was completed in 1834, is still finer, but not so extensive. It is adorned with two colossal sphinxes, brought from Egypt, which are placed in front of the Academy of Arts. There are 140 Russian-Greek churches, 40 of other Christian communities, 2 Greek convents, a synagogue, and a mosque. Divine service is performed in fifteen languages. Of the Greek churches the most remarkable are, 1, the Isaac's Church, which when finished will be the most magnificent—it is to be built entirely of marble; 2, the beautiful cathedral of the Mother of God of Casan; 3, the church of St. Nicholas; 4, the church of Alexander Nevsky, in the convent of the same name, containing the body of the saint in a silver sarcophagus (the convent is the residence of the archbishop of Petersburg, and contains an academy and a seminary, with a fine library); 5, the church of St. Peter and St. Paul, in the citadel, which contains the tombs of the imperial family. The number of magnificent palaces and public buildings is so great that we can do little more than barely enumerate the most remarkable:—1, The Imperial Winter Palace has been described as the most conspicuous by all travellers: it was entirely destroyed by fire, about three years ago, but is now rebuilt. It was fortunate that, by the great exertion of the imperial guard, the fire was prevented from extending to the Hermitage, built by Catherine, which contains a costly library, a valuable collection of paintings, and other treasures. 2, The Marble Palace, an elegant but gloomy-looking building. 3, The Taurida Palace, with its fine gardens, presented to Prince Potemkin by Catherine II. 4, The Anitchkov Palace, the residence of the emperor Nicholas while he was grand-duke. 5, The Old Michailov Palace, where the emperor Paul resided and died. 6, The New Michailov Palace, with a park, the residence of the grand-duke Michael. It was built between the years 1819 and 1825, and is one of the finest palaces in Europe. The number of what are called crown-buildings is very great. Among them are, 1, the Admiralty, surrounded on three sides by the dock-yards; 2, the splendid building belonging to the general staff; 3, in the very extensive Isaacs Square, the Senate House, the General Synod, the Palace of the War Department, the large and handsome riding-school of the guard; 4, the Alexander Theatre, in the Nevsky Perspective; 5, the fine palace of the Imperial Assignat Bank; 6, the New Arsenal; 7, the Gostinoi-Dvor, a great bazaar, two stories high, each containing 170 shops; 8, the Academy of the Fine Arts, &c. The Field of Mars, adorned with a statue of Suwaroff, is extensive enough to admit 40,000 or 50,000 men to be reviewed in it. The Field of Mars is bounded on two sides by the imperial gardens, on the third by the Winter Palace, and on the fourth by a row of massive buildings. The most recent of the public monuments is the Alexander Column, erected in honour of the emperor Alexander. There are also a celebrated equestrian statue of Peter the Great, a granite obelisk, 82 feet high, in honour of Romanzov, and the above-mentioned statue of Suwaroff.

The Russian sovereigns have done much to promote science and learning: academies and schools have been founded and liberally endowed by them, and learned men invited from foreign countries. Among these establishments are the university, founded in 1819, which has neither a theological nor a medical faculty; the academy of sciences, founded by Peter I., on the plan of Leibnitz; the academy of fine arts; the pedagogical institution for training teachers in the higher departments of learning; the ecclesiastical seminary in the convent of St. Alexander Nevsky; the medico-chirurgical academy; four gymnasia; the Oriental institution; numerous institutions for the army and navy; the mining academy; the female schools of St. Catherine; the Smolnoi convent, and the foundling hospitals. There are also a great number of private schools, and many private masters and governesses in families, who are mostly Germans. The collections of all kinds are very rich. The imperial public library consists of above 400,000 volumes; that of the academy of sciences, of 100,000; and almost every establishment has its own library. The principal collections are the zoological, the antiquarian, and that of Asiatic coins in the academy of sciences; the cabinet of coins of the Oriental institution; the splendid collection of minerals of the mining academy, in which there is a lump of pure native gold weighing 25 lbs. and a lump of platinum of 10 lbs.; the collections in the Hermitage, Romanzov's museum, the extremely rich collections of exotic plants in the hothouses of the botanic garden, and many private collections. The hospitals or charitable institutions of all descriptions are very numerous and well supported, rivalled perhaps only by those of London, the virtue of charity being one of the most prominent features of the Russian character. The number of houses in 1838 was 8665, of which 3243 were of stone, and the remainder of wood: this seems a small number in proportion to the population, but some of the houses are extremely large; in 1833 there were 13 houses each inhabited by above 1000 persons, 121 by 300 to 1000 persons, 223 by 200 to 300 persons, and 671 by 100 to 200 persons.

The ground on which St. Petersburg stands is low and swampy, and the surrounding country is a morass and forest, except where it has been ameliorated by industry and art. It has been calculated that, on an average of 10 years, there are 97 bright days, 104 rainy, 72 of snow, and 97 unsettled. The ice in the Neva never breaks up before the 22nd of March (once only on the 6th of March), nor later than the 27th of April; the earliest time of the river's freezing is the 20th of October, and the latest the 1st of December. The few bright days are generally during the greatest heat or the severest cold. The spring is very short; a sudden transition brings summer at once, which all classes hasten to enjoy, in the adjacent villas, in hospitality and social amusements. In summer the nights are bright and generally warm. During the night, parties, frequently attended by music, promenade the streets in every direction, and the simple melody of the popular ballads floats on the air, from the boats that glide on the canals and the smooth surface of the Neva. Charmed by the novelty and beauty of the scene, the stranger, expecting the approach of night, continues to linger till he is beguiled of his sleep, and sees with surprise the first beams of the rising sun gild the summits of the palaces and temples. In autumn St. Petersburg is one of the most disagreeable spots on the face of the earth. On the whole, winter is perhaps the best season; at least it has many advantages over the foggy winter of more southern climes. The cold, when it once sets in, is equal and constant, and it strengthens and braces the body. Travelling in sledges over the hard snow is convenient and agreeable; the Russians too know how to defend themselves against the cold better perhaps than any other people. All commercial intercourse with foreign countries being suspended during the winter, the citizens indulge their national fondness for luxury and amusements. The great masked ball (as it is called) on New Year's Day brings together persons of all classes in the Winter Palace: tickets are very easily obtained, and above 30,000 are usually issued. Nobody however is masked, nor is there any dancing. The river being frozen over for several months, the surface presents a scene like that which was exhibited when a fair was held on the Thames, nearly resembling Bartholomew fair. The populace are amused with swings, roundabouts, and the like, and above all by the ice-hills, which are inclined planes of considerable height, covered with blocks of ice. The ascent is by a flight of steps at the back. A low sledge with one person in it glides down the plane with such rapidity that it is carried by the impetus to the next ice-hill, when the driver takes his sledge on his back, ascends the steps, and descends on the other side. This is the favourite amusement of the Russians. There are likewise great popular amusements during Lent in Isaac's Square.

In summer all those who have the means go into the country. There are numerous country-houses in the islands, and on the road to Peterhof, Strelna, and Oranienbaum. Of the islands in the Neva, north of St. Petersburg, that of Krestovsky is the most beautiful; the isle of Yelagin has an imperial summer palace with a fine park. Kammenoi-Ostrov, another island, contains a palace belonging to the grand-duke Michael. Peterhof, on the bay of Cronstadt, the road to which is a noble causeway bordered by fine gardens and country-seats, has a large garden and fine waterworks. A grand fête is generally celebrated here on the 13th of July, in honour of the birthday of the empress Alexandra, when the gardens are splendidly illuminated and enlivened with bands of music, and above 100,000 persons are assembled. Oranienbaum, on the Gulf of Finnland, the summer residence of the grand-duke Michael, is still more beautifully situated than Peterhof. Zarskoje-Selo is a very magnificent imperial country-seat, with an immense park and noble gardens. A large portion of this palace was burnt down in 1820. At a short distance is the Pulkowaberg, on which the emperor Nicholas has caused a fine observatory to be erected, and furnished with the best instruments. Pavlovsk, near the town of the same name, is an imperial country-seat, with a fine park laid out in the English style by Brown.[*] At Gatschina, Tschesme, and Strelna there are likewise country-seats belonging to the Imperial family. [CRONSTADT; NARVA.]

According to the account given by the chief of the police for 1839, the population amounted in that year to 476,386, of whom 338,512 were males and 138,874 females: in 1838 the total was 469,720, so that there was an increase in 1839 of 6666. It appears from M. Köppen, that of the 469,720 inhabitants, in 1838, there were in the city and its district, including Cronstadt, only 53,883 males who had their legal settlement there. Supposing the total to be 109,000, including females, there remain 360,000 strangers from other provinces, of whom the great majority are males. We quote from the official tables a few instances:—

	Men.	Women.
Persons not of noble birth	19,210	9,687
Artisans included in the guilds	19,238	3,692
The garrison, not including the officers	48,406	10,336
Domestics	52,357	14,674
Workmen of the class of peasants	103,237	23,076

St. Petersburg is not only the capital but the greatest manufacturing city of the empire. There are above two hundred manufactories of different descriptions, some carried on by private individuals, of silk, cotton, woollen, leather, glass, gold and silver articles, watches, surgical instruments, paper, snuff and tobacco, sugar, &c. There are others which the government has considered it advisable to carry on upon its own account; such are the great manufactory of tapestry, a large manufactory of aqua-fortis, with an assay-office and a mint; a plate-glass manufactory, which produces mirrors 14 feet high and 7 feet wide, a porcelain manufactory, and a great manufactory of cotton and linen, in which steam-engines are employed, at Alexandrovsk, near the city; a considerable part of this manufactory was last year destroyed by fire. The government has likewise a cannon-foundry and powder-mills.

The commerce of St. Petersburg is very considerable. Cronstadt is the harbour. The following is the official account for the year 1839:—arrived at Cronstadt, in 1839, 1378 ships, of which 912 with cargoes and 466 in ballast; 1395 sailed, of which only 27 were in ballast—of these 50 had wintered at Cronstadt; this year only 33 remained to winter. Above 700 of these ships were English. The steam-boats to Lübeck performed twenty-one voyages, those to London twelve, to Hâvre eight, and to Revel twenty-one. Above 12,000 barks bring to St. Petersburg from the interior articles of Russian produce and manufactures for the consumption of the capital and for exportation. The total value of the imports was 198,961,386 rubles (in bank assignats), and the value of the exports 132,018,295 rubles; total 330,979,681 rubles. Deducting 2,504,445 rubles, the value of the goods exported and imported by the captains of ships and passengers, the remaining operations were effected by 170 commercial houses, of which 94 transacted business under a million of rubles, and 76 above that amount. Three houses did business to the amount of more than seven millions, two of eight millions, three of ten millions, one of twelve millions, one of nineteen millions, and one of twenty-six millions. Among these eleven houses there is not one Russian name; they are all German and English, except one French. The exports are hemp, flax, tallow, leather, iron, tobacco, canvas, coarse linen, bees'-wax, linseed, linseed-oil, tar, potash, &c. The increased exportation of wool deserves to be noticed. From 1800 to 1814, the average annual quantity exported was under 20,000 poods; from 1814 to 1824, under 36,000 poods; from 1824 to 1834, 112,000 poods; and in 1838 it was 360,760 poods. The imports are colonial produce of all kinds, manufactures of silk, cotton, hardware, French wines, jewellery, and all articles of luxury and fashion. The immense preponderance of the trade with England is proved by the number of ships employed in it. The effects of a rupture with England may be inferred from the fact that in the year 1808, which followed the alliance between Alexander and Napoleon, concluded at Tilsit in September, 1807, the value of the imports fell to 1,152,000 rubles, that of the exports to 5,875,000 rubles, and the duties of customs from five millions to 918,000 rubles. The actual revenue now derived from the customs is about 50 millions of rubles.

(Schmidtlin, *La Russie et la Pologne;* Hörschelmann; Stein's *Handbuch; Conversations Lexicon;* Cannabich, *Lehrbuch der Geographie;* the *Russian Journal of Commerce*, and *Journal of the Department of the Interior;* and *Plan of St. Petersburg*, published by the Society for the Diffusion of Useful Knowledge.)

Though by no means so complete as could be wished, the following table will serve as an architectural synopsis of the more remarkable structures of St. Petersburg, few of which, it must however be confessed, are of high architectural quality, or calculated to stand the test of critical examination, although from their magnitude and general air of stateliness they produce a favourable first-sight impression on the stranger:—

Table of Public Buildings.

	Date.	Architect.	Remarks.
The Fortress	1706-40	Tressini	
Directory Senate	1710		Originally Prince Menzikov's palace.
Cathedral of St. Peter and Paul in Fortress	1712-27	Tressini	
The Foundry	1733	Schumacher	
Summer Palace	1742	Rastrelli	
Smolnoi Monastery, Church		Rastrelli	
St. Nicholas Morskoi	1743		
The Anitchkov Palace	1748	Rastrelli	
Winter or Imperial Palace	1754-62	Rastrelli	A very large but grotesque pile; burnt down December 1837; rebuilt 1839.
Marble Palace	1770-85	Grimaldi	
Hermitage, the Little	1775	Lamotte	
——— the Great	1775	Felten	
——— Theatre	1782	Quarenghi	Interior, plan of an antient theatre. Order Corinthian.
Nevsky Monastery Church	1776-90	Starov	
Old Arsenal	1776		Hexastyle Doric in centre.
Colossal equestrian statue (Peter the Great)	1782	Falconet	
Taurida Palace	1783	Starov	
Obutchov's Hospital	1783		
Manège of the Imperial Guards		Quarenghi	A Roman Doric octastyle portico entire width of front. Sculptured pediment; ditto frieze within portico.

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[*] The construction of an iron rail-road from St. Petersburg to Pavlovsk and Zarskoje-Selo has greatly increased the number of visitors to those places.

	Date.	Architect	Remarks.
Gostinoi Dvor, or Bazaar	1785		
Academy of Fine Arts	1788	Kakorinov	A very handsome structure. A Roman Doric order on a lofty arcaded basement.
Cathedral of St. Alexander Nevsky	1790	Starov	
Imperial Library	1795	Sokolov and Rusca	Ionic on basement.
Marine Cadets' College	1796		
Palace of St. Michael	1797-1800	Brenna	Italian style. Now used for the engineer corps.
Catholic Chapel, Knights of Malta	1798	Quarenghi	Order Corinthian; front four attached columns beneath pediment.
Imperial Bank		Quarenghi	
Institut Demoiselles Nobles, Smolnoi Monastery		Quarenghi	Front 730 feet; centre Ionic octastyle on basement.
Foundling Hospital on the Moika	1798		
Medical, &c. Academy	1799	Porta	Corinthian portico.
Troitzki Church			Byzantine style.
Romanzov Obelisk	1799	Brenna	Bronze. Height 82 feet.
Academy of Sciences	1799	Zakharov	Octastyle Ionic portico.
Admiralty	1801	Zakharov	A most extensive range of buildings of rich design.
—— Chapel		Montferrand	
The Casan Cathedral	1801-11	Voronikhin	Corinthian hexastyle [see PORTICO, Plans], with curved colonnades extending from it.
Russian Academy		Melnikov	
Imperial Hospital for Sick Poor	1803	Quarenghi	Octastyle Ionic portico.
Great Theatre	1804	Thomond	Ditto.
Birzha, or Exchange	1804-10	Thomond	Roman Doric, peripteral decastyle, with two rostral columns in front.
New Arsenal	1808	Dimertzov	
St. Sergius' Church		Dimertzov	
Salt Magazine		Volkhov	
Church of St. Vladimir	1811		
—— St. Peter	1817		
—— St. Catherine, Vassili Ostrov		Mikhaelov	Corinthian hexastyle portico. Dome.
—— Imperial Mews		Trombara	
Isaac's Church (rebuilding)	1818	Montferrand	
Church of the Skorbyashtnik (or Sufferers)	1818	Rusca	Front, Ionic hexastyle, attached columns. Interior a rotunda with 24 columns.
Grand-duke Michael's palace	1819-25	Rossi	Corinthian order on basement. Centre an octastyle prostyle.
Hôtel des Mines, or Mining Academy	1819		
The Etat Major	1821-30	Rossi & Bruilov	
The Hall of Archives		Rossi & Clarke	Entirely constructed of cast-iron. Style Gothic. Dimensions 142 by 57 feet.
Theatre, Aplugin Island	1826	Montferrand	
Narvsky Gate, or Triumphal Arch	1831-3	Quarenghi	Previously designed by Quarenghi, and erected temporarily in timber; now executed in metal by Clarke and Pratt.
Alexandrinsky Theatre	1832	Rossi	
Lutheran Church of St. Peter and St. Paul	1832	Bruilov	
Alexander Column	1832	Montferrand	Shaft a granite monolith, 84 feet high, surmounted by a colossal figure of Faith.
Church of St. Catherine the Martyr	183	Const. Thon	
Michailovsky Theatre		Bruilov	
Winter Palace	rebuilt 1838	Bruilov and Stasov	
Observatory	1837	Bruilov	
Triumphal Arch		Quarenghi and Starov	
Duke of Leuchtenberg's palace	1839	Stackelschneider	Grecian style.

PETERSFIELD, a market-town, parish, and parliamentary borough in the hundred of Finch-Dean, and in the present northern, but in the old southern division of Hampshire. The town, which is on the road from London to Portsmouth, is 52 miles south-west from London, and 16 miles east by south from Winchester, direct distances. It is a clean country town, partly lighted with gas, tolerably paved, and amply supplied with water. The trade is unimportant, but fairs for sheep and horses are held March 5, July 10, and December 11. The market-day is Saturday. The assessed taxes levied in 1830 amounted to 540*l.* The population of the town and parish in 1831 was 1803. The living, attached to the chapelry of Petersfield, is a curacy, which, with the rectory of Buriton, are in the diocese of Winchester and patronage of the bishop of that see, and yield an average net income of 1194*l.* Near the chapel is an equestrian statue of William III. There is a school called Churcher's college, from the name of the founder, who, in 1722, bequeathed the sum of 3000*l.* Bank stock and 500*l.* in cash for its establishment and support. The boys, from ten to twelve in number, are clothed, fed, and instructed in writing, arithmetic, and so much of the mathematics as is applicable to navigation. Several acts of parliament have been obtained for regulating the expenditure of the funds of the charity, which have increased considerably.

According to the Corporation Reports, no royal charter of incorporation is known to have been conferred upon the town; but in Warner's 'History of Hampshire,' and in other works, it is stated to have been incorporated by a charter of Queen Elizabeth, which is also confirmed by the Report of the Commissioners on the boundary of the borough. The town is governed by a mayor, chosen annually at the court-leet of the lord of the manor, but the functions of the mayor are merely nominal. The borough of Petersfield returned members to parliament as early as Edward I., and two members continuously from the reign of Edward VI. till the passing of the Reform Act, since which it has been represented by one member. The present parliamentary boundary includes the old borough of Petersfield and the tithing of Sheet; the parishes of Buriton, Lyss, and Froxfield; the tithings of Ramsden, Langrish, and Oxenbourn, in the parish of East Meon, and also the parish of Steep, except the tithings of North and South Ambersham.

(*Sixteenth Report of the Commissioners on Charities*, p. 296; *Reform Act and other Parliamentary Papers;* Warner's *Hist. of Hampshire*, &c.)

PETERWARDEIN, or **PETERVARA**, the principal and frontier fortress of Slavonia, the Gibraltar of Hungary, is situated in 45° 15′ N. lat. and 19° 55′ E. long., in the neighbourhood of some mountains and fruitful hills, on the right bank of the Danube, near the angle formed by the sudden change in the course of that river from due south to east. On a rock isolated on three sides stands the upper fortress and the hornwork; on the northern foot of the rock lies the lower fortress, which includes what is properly the town, and is partly on a gentle slope. It commands the Danube, whose waters bathe the walls on the west and south sides. It is a place of extraordinary strength both by nature and art. As a precaution in case of a very close siege, a well has been excavated in the rock to a depth below the surface of the Danube. The lower fortress has very broad and deep moats, which may be filled with water from the Danube, lofty walls, and many bastions and ravelins, by which it is separated on the south side from the two suburbs Ludwigsthal and Rochusthal. One principal street, and two others parallel to it, with a pretty extensive parade, form the whole town, which consists of only fourteen public buildings and forty-eight houses, most of the latter being only one story high. The principal buildings are the arsenal, the residence of the commandant, and the Roman Catholic parish church, formerly belonging to the Jesuits. Besides the two above-mentioned suburbs, some writers reckon the village of Bukowitz, about a league distant, as belonging to Peterwardein. The population of the town, the two suburbs, and Bukowitz, including the garrison, is stated at 6500. The fortress is capable of containing a garrison of 10,000 men.

Peterwardein is connected, by a bridge of boats over the Danube (here 700 feet wide, and from 50 to 60 feet deep), with the town of Neusatz, on the opposite bank.

(Von Jenny, *Handbuch für Reisende in dem Oesterreichischen Kaiserstaate;* W. Blumenbach, *Neuestes Gemälde der Oesterreichischen Monarchie.*)

PETIOLE is that part of the leaf commonly called the stalk; it is usually a contracted part of the leaf through which the wood-veins pass from the trunk, but in other cases it is thin, expanded flat, or rolled up in a sheathing manner, when it is scarcely to be distinguished from the blade of the leaf itself. It is the opinion of some botanists that the leaves of endogens, in which the veins are parallel instead of being reticulated, consist exclusively of petiole; but this seems contradicted by grasses which have both a petiole and lamina, with parallel veins.

PETIS DE LA CROIX, FRANÇOIS, a learned French Orientalist, born at Paris, towards the close of 1653, was the son of the king's interpreter for the Oriental languages, and received an education to qualify him for the same employment. At the early age of sixteen he was sent, by the minister Colbert, to reside in the East. He spent several years at Aleppo, Ispahan, and Constantinople, where he became master of the Arabic, Persian, and Turkish languages. During his stay at the first-named city he translated into elegant Arabic an account of the campaign of Louis XIV. in Holland, which his contemporary Pellisson published in 1671. He returned to Paris in 1680, and two years afterwards was sent to Marocco, as secretary to M. de Saint Amand, who had been appointed ambassador to Muley Ismail, the reigning sultan. He is reported to have pronounced before that sovereign a speech in Arabic which excited the admiration of the whole court by the facility of the delivery and the elegance and purity of the style. In the two following years he accompanied the French armaments against Algiers, under Duquesne, Tourville, and D'Amfreville [Algiers], filling under each of these generals the situation of secretary-interpreter of the marine, in which capacity he was employed to translate into Turkish the treaty of peace, concluded in 1684, between France and the regency of Algiers. In 1685 he performed the same office with respect to the negotiations with Tunis and Tripoli, when he gave decisive proofs of his integrity and patriotism. It is asserted that while the negotiations with the latter power were going on (one of the conditions of the treaty being that the bey of Tripoli should pay to the king of France the sum of 600,000 livres) Petis was offered a considerable bribe if he would put down in the original treaty Tripoli crowns instead of French ones, which would have made a difference of a sixth part, but his fidelity to his sovereign was incorruptible. In 1687 he assisted the Duke de Mortemart in concluding a treaty of peace and commerce with the empire of Marocco. In short, it was through his intervention that all the affairs between France and the Eastern courts were transacted from the year 1680, when he was first employed in diplomacy, to the time of his death. As a reward for his eminent services, Petis was appointed, in 1692, Arabic professor to the Collège Royal de France, and after the death of his father (1695) the office of Oriental interpreter was also conferred upon him. From this period Petis never left his native country, but employed himself in various translations from the Eastern languages, with most of which he was perfectly well acquainted; for, besides the Arabic, Turkish, and Persian, he is said to have been well acquainted with the Mogul, Armenian, and Ethiopian.

He died at Paris, December 4, 1713, at the age of sixty, leaving a son, named Alexandre Louis Marie, who succeeded him in his office of secretary-interpreter of the marine, and made likewise several translations from the Persian and the Turkish.

His principal publications are, 'Les Mille et un Jours' (the thousand and one days), translated from the Persian, Paris, 1710-12, 5 vols. 12mo.; 'Contes Turcs,' a translation from Sheikh Zadeh, Paris, 1707, 12mo.; 'The History of Timur,' translated from the Persian of Sheref-ed-din Ali Yesdi, Paris, 1722, 4 vols. 12mo. Most of his works however still remain in manuscript; these are his 'Travels through Syria and Persia, from 1670 to 1680;' a 'History of the Conquest of Syria by the Arabs,' translated from the Arabic of Wakedi; 'The Bibliographical Dictionary of Haji Khalfah,' from the Turkish; a 'History of the Ottoman Empire,' from the same language; a 'Dictionary of the Armenian Language;' a work on 'The Antiquities and Monuments of Egypt;' an 'Account of Ethiopia;' a treatise entitled 'Jerusalem, Modern and Antient;' and several others, the titles of which are given at full length in the 'Mémoire sur le Collège Royal,' by Goujet, Paris, 1758. In some biographies of Petis de la Croix, a 'History of Gengis-Khan,' from the Persian (Paris, 1710), is attributed to him; but this is an error, since the above translation, though edited by Petis, was the work of his father, whose Christian name was also François.

(Goujet, *Mémoire Historique et Littéraire sur le Collège Royal de France*, Paris, 1758, 4to.; *Biographie Universelle*, vol. xxxiii.)

PETIT, JEAN LOUIS, was born at Paris in 1674. Littre, a celebrated professor of anatomy, being a resident in his father's house, inspired the young Petit with such a zeal for the same study, that at twelve years of age he acquired sufficient dexterity in dissecting to be appointed to prepare the subjects for his preceptor's lectures, and to be placed at the head of his anatomical class. At sixteen he was apprenticed to a surgeon; and so great was his zeal in his studies, that Mareschal, the chief surgeon of the Hospital La Charité, on going very early in the morning to visit his patients, more than once found Petit asleep by the door, awaiting his arrival, that he might secure a good place during the operations. In 1692 he obtained the post of surgeon in the army, and was in active service till 1700, when he returned to Paris and obtained the degree of Master in Surgery. Here he delivered several courses of lectures to a school of anatomy and surgery which he established, and in which many of those who were afterwards among the first surgeons in Europe were pupils. His reputation rapidly increased, and he was elected a member of the Academy of Sciences at Paris, of the Royal Society of

London, and of many learned societies. In 1731, at the foundation of the Academy of Surgery in Paris, of which he was one of the most active promoters, he was elected director. He died in 1760.

Petit was for many years the most renowned surgeon in Europe, and contributed more to its advancement as a science than any one who had preceded him. He not only raised the character of surgery in France, but many of his pupils were invited to take charge of important offices in different parts of Europe, and by carrying thither his improvements and some of his zeal, gave a fresh stimulus to its progress.

At the time of his death, Petit had been engaged twelve years in the composition of an extended 'Treatise on Surgery.' It was completed and published in 1774, by De Lesne, and is still a standard work. The other most important of his surgical writings are a 'Treatise on the Diseases of the Bones,' and numerous papers published in the Memoirs of the Academies of Surgery and of the Sciences.

PETIT, PETER, was born 31st December, 1598 (Niceron), or 8th December, 1594 (*Biog. Univers.*), at Montluçon, a small town in the present department of the Allier. When young, he occupied himself in mathematical studies and experimental philosophy, which he afterwards evinced considerable aptitude in applying. In 1626 he succeeded his father in the office of 'Controlleur en l'Election de Montluçon,' which office he sold in 1633, after the death of his parents, and then removed to Paris. Here he was introduced to the Cardinal de Richelieu, and appointed by that minister to inspect the seaports of France and Italy. Between this time and 1649 there were conferred upon him the appointments of provincial commissary of artillery, intendant of fortifications, and geographer, engineer, and councillor to Louis XIII. Upon his return from Italy, he communicated to Mersenne a critical examination of the 'Dioptrics' of Descartes, which led to his being introduced to Fermat, who had also questioned the soundness of the Cartesian theory. Subsequently however he became very intimate with Descartes and an unreserved supporter of all his doctrines. In 1646-7, a series of experiments made by Pascal and Petit confirmed the explanation then recently given by Torricelli of the phenomena of the barometer and common pump. Petit died 20th August, 1667, at Lagni on the Marne, about five leagues from Paris.

The following list of his works is given by Niceron, in the forty-second volume of the 'Mémoires des Hommes Illustres:'—1, 'L'Usage du Compas de Proportion,' Paris, 1634, 8vo.; 2, 'Discours Chronologiques,' Paris, 1636, 4to.; 3, 'Carte du Gouvernement de la Capelle;' 4, 'Avis sur la Conjonction proposée des Mers Océane et Méditerranée par les Rivières d'Aude et de Garonne,' 4to.; 5, 'Observations touchant le Vide fait pour la première fois en France,' Paris, 1647, 4to.; 6, 'Discours touchant les Remèdes qu'on peut apporter aux Inundations de la Rivière de Seine dans Paris,' 1658, 4to.; 7, 'Observationes aliquot Eclipsium—Dissertatio de Latitudine Lutetiæ et Magnetis Declinatione—Novi Systematis Confutatio,' published in Duhamel's 'Astronomy,' Paris, 1659-60—(the object of the second of these tracts is to prove that the latitude of Paris was not permanent, an opinion which had been entertained with regard to geographical positions generally by the Italian astronomer Maria); 8, 'Dissertation sur la Nature des Comêtes,' Paris, 1665, 4to. (written at the desire of Louis XIV., to lessen the alarms of the people occasioned by the appearance of the comet of 1664); 9, 'Lettre touchant le Jour auquel on doit célébrer la Fête de Pâques,' Paris, 1666, 4to.; 10, 'Dissertations sur la Nature du Chaud et du Froid,' Paris, 1671, 12mo.

(Montucla, *Histoire des Mathématiques*; Niceron.)

PETITION. A petition is an application in writing, addressed to the lord chancellor, the master of the rolls, or to the Equity side of the Court of Exchequer, in which the petitioner states certain facts as the ground on which he prays for the order and direction of the court. Petitions are either *cause* petitions or not. A cause petition is a petition in a matter of which the court has already possession by virtue of there being a suit concerning the matter of the petition; and the petitioner is generally either a party to such suit, or he derives a title to some interest in the subject matter of the suit from a party to it. When there is no suit existing about the matter of the petition, it is called an *ex parte* petition.

Some cause petitions are called petitions of course, and relate to matters in the ordinary prosecution of a suit, and before a decree. Such petitions are granted upon application of the party petitioning; and they may be presented at any time, whether the courts are sitting or not. They are not answered when presented, in the same manner that other petitions are; but the order to be made on such petition (if presented at the Rolls) is at once drawn up by the secretary of the master of the Rolls, unless they are petitions for rehearing. Such petitions may also be presented to the lord chancellor.

Other petitions in a cause, which are not petitions of course, and may be called special petitions, have for their object to carry a decree into execution. Thus a party who has an interest in a fund in court, a legatee for instance who was a minor when the decree was made, may, when he is of age, apply by petition to have his share paid to him, because his right to it has been recognised by a decree or order of the court, or by a master's report which has been confirmed. The nature of the petitions in a cause will of course vary with the subject-matter of the suit.

Petitions, not in a cause, are of various kinds, and many of them are presented under the authority of particular acts of parliament. These also are called special petitions. Thus a petition may be presented for the appointment of guardians to infants, and for an allowance for their maintenance; for the purpose of procuring an order of court that infant trustees and mortgagees may execute conveyances; and for various other purposes. In matters of lunacy, the form of proceeding in the first instance is by petition to the chancellor, to whom the care of lunatics and idiots is specially delegated by the crown, and the prayer of the petition is for a commission to inquire into the state of mind of the alleged lunatic. [LUNACY.] In subsequent proceedings relating to the property of a person, when found lunatic by a jury, a petition is the regular and usual course of proceeding; and suits are not commenced or defended for the lunatic without the previous approval and direction of the court.

All special petitions must be presented to the court to which they are addressed, in order to be answered: until they are answered, the court is not fully possessed of the matter of the petition. The answer, which is written on the copy of the petition and signed by the judge, requires the attendance before him of all parties concerned in the matter of the petition at the hearing thereof. It is the business of the petitioning party to serve all proper parties with notice of this petition, and the answer to the petition becomes an order of the court, upon every person whom the petitioner chooses to serve with the petition, to attend at the hearing of it; and if such person be absent at the hearing, he will be bound by the order made on the petition. Service of the petition consists in delivering a true copy of the petition as answered to the clerk in court whose attendance the petitioner thinks necessary, or to the party himself. In some special cases, the petitioner is permitted, on special motion, supported by an affidavit that he is unable to serve the party personally, to leave the copy of the petition at the party's house with one of his family, and this will be considered good service. Special petitions frequently require to be supported by affidavits of the petitioner or some other person, or of both; and such affidavits may be filed at any time after the petition is answered. If a petitioner choose to serve a party with a petition, whose presence is considered by the court to be unnecessary, he must pay such party the cost of attending at the hearing of the petition.

A petition is heard in court by the counsel for the petitioner stating the substance and prayer of the petition, and by reading or briefly stating the contents of the affidavits filed in support of the petition, if any have been filed. If the prayer of the petition is opposed by any of the parties who have been served with it, they are heard by their counsel, and their affidavits also, if any have been filed, are read or briefly stated to the court. On hearing the matter of the petition and the affidavits on both sides, the court either dismisses the petition or makes such order as it thinks fit. The order when made is drawn up, passed, entered, served, and enforced like any other decree or order of the court. Before any order made on a petition can be passed, the original petition must be filed with the clerk of reports. The order itself in the present practice recites no part of the petition except the prayer.

PETITION OF RIGHT. Where the crown or a subject has a cause of action against a subject, the ordinary mode of putting that cause of action into a course of legal investigation is by the king's writ, requiring the party to appear in court to answer the complaint. Where the claim is against the crown itself, as this course cannot be pursued, the mode of proceeding provided by common law is to present a petition to the crown, praying for an inquiry and for the remedy to which the party conceives himself to be entitled. As by Magna Charta the king is not to delay right, he is bound, if the petition presents that which has the semblance of a legal or equitable claim, to indorse the petition with the words 'let right be done;' which indorsement operates, in the case of a claim of a legal nature, as a warrant and command to the lord chancellor to issue a commission to inquire into the truth of the matters alleged in the petition. A commission accordingly issues to six or eight persons, who summon a jury, of whom not less than twelve or more than twenty-three are impannelled, and who, under the superintendence of the commissioners, hear the evidence which the petitioner, or, as he is called, the suppliant, has to adduce in support of his statement. If the jury negative the allegations contained in the petition, the commission is at an end; but the suppliant is at liberty to sue out a new commission or commissions till a jury return an inquisition in which the allegations are found to be true. The crown may, upon this return, insist that the facts alleged by the suppliant, and found by the inquisition, do not in point of law entitle the suppliant to the remedy which he claims. The question of law thus raised by demurrer to the inquisition is argued before the lord chancellor. The crown however, notwithstanding the finding of the jury, may deny the truth of the facts, or, admitting them to be true, may allege other facts which show that the suppliant is not entitled to what he claims. To such facts the suppliant must reply. Any issue of fact joined between the suppliant and the crown is tried in the court of King's Bench, the lord chancellor not having the power to summon a jury. Final judgment is given for or against the suppliant according to the result of the argument upon the demurrer or of the trial of the issue.

If the suppliant in his petition pray that the investigation may take place in a particular court, and the royal indorsement on the petition directs that course to be pursued, the proceedings take place in the court indicated by the indorsement, instead of the Court of Chancery.

Before the abolition of the feudal tenures by the Commonwealth (confirmed after the Restoration, by 12 Car. II., c. 24), the rights of the crown and of the subject being often brought into collision, occasions for proceeding by petition of right were very frequent, and as this mode of proceeding was dilatory and expensive, two acts, passed in the reign of Edward III., enabled parties aggrieved in certain cases by legal proceedings of the crown, to enter their claim upon those proceedings, without being put to their petition of right, with its expensive commission to inquire. This new course was called a 'traverse of office,' where the subject denies the matters contained in the 'office' or *ex parte* record constituting the king's title, and a 'monstraunce de droit,' where the facts upon which the king's title rests are admitted but their effect is avoided by the allegation of other facts showing a better title in the claimant. In modern practice the petition of right is not resorted to, except in cases to which neither a traverse of office nor a monstraunce de droit applies, or after those remedies have failed.

The petition of right is supposed by Lord Coke and others to be so called because the investigation prayed for is demandable as of right, and not granted as a matter of grace or favour; but the Latin term 'petitio justitiæ' shows that the words are used in the sense of a 'petition *for right*.'

PETITION OF RIGHT. In the first parliament of Charles I., which met in 1626, the Commons refused to grant supplies until certain rights and privileges of the subject, which they alleged had been violated, should have been solemnly recognised by a legislative enactment. With this view they framed a petition to the king, in which, after reciting various statutes by which their rights and privileges were recognised, they pray the king 'that no man be compelled to make or yield any gift, loan, benevolence, tax, or such-like charge, without common consent by act of parliament,—that none be called upon to make answer for refusal so to do,—that freemen be imprisoned or detained only by the law of the land, or by due process of law, and not by the king's special command, without any charge,—that persons be not compelled to receive soldiers and mariners into their houses against the laws and customs of the realm,—that commissions for proceeding by martial law be revoked: all which they pray as their rights and liberties according to the laws and statutes of the realm.'

To this petition the king at first sent an evasive answer: 'The king willeth that right be done according to the laws and customs of the realm, and that the statutes be put in due execution, that his subjects may have no cause to complain of any wrongs or oppressions contrary to their just rights and liberties, to the preservation whereof he holds himself in conscience obliged as of his own prerogative.' This answer being rejected as unsatisfactory, the king at last pronounced the formal words of unqualified assent, 'Let right be done as it is desired.' (1 Car. I., c. 1.) Notwithstanding this however the ministers of the crown caused the petition to be printed and circulated with the first insufficient answer.

PETITOT, JOHN, an eminent painter in enamel, the son of a sculptor and architect, was born at Geneva, in 1607. Being designed for the trade of a jeweller, he was placed under the direction of Bordier, and in this occupation was engaged in the preparation of enamels for the jewellery business. He was so successful in the production of colours, that he was advised by Bordier to attempt portraits. They conjointly made several trials, and though they still wanted many colours which they knew not how to prepare for the fire, their attempts had great success. After some time they went to Italy, where they consulted the most eminent chemists, and made considerable progress in their art, but it was in England, whither they removed after a few years, that they perfected it.

In London they became acquainted with Sir Theodore Mayern, first physician to Charles I., and an intelligent chemist, who had by his experiments discovered the principal colours proper to be used in enamel, and the means of vitrifying them, so that they surpassed the boasted enamelling of Venice and Limoges. Petitot was introduced by Mayern to the king, who retained him in his service and gave him apartments in Whitehall. He painted the portraits of Charles and the royal family several times, and copied many pictures, after Vandyck, which are considered his finest works. That painter greatly assisted him by his advice, and the king frequently went to see him paint.

On the death of Charles, Petitot retired to France with the exiled family. He was greatly noticed by Charles II., who introduced him to Louis XIV. Louis appointed him his painter in enamel, and granted him a pension and apartments in the Louvre. He painted the French king many times, and, amongst a vast number of portraits, those of the queens Anne of Austria and Maria Theresa. He also occupied himself in making copies from the most celebrated pictures of Mignard and Lebrun.

Petitot, who was a zealous Protestant, dreading the effects of the revocation of the Edict of Nantes, solicited leave, but for a long while in vain, to return to Geneva. The king employed Bossuet to endeavour to convert him to Romanism, in which however that eloquent prelate was wholly unsuccessful. At length Louis permitted him to depart, and leaving his wife and children in Paris, he proceeded to his native place, where he was soon after joined by his family. Arrived now at eighty years of age, he was sought by such numbers of friends and admirers, that he was forced to remove from Geneva and retire to Vevay, a small town in the canton of Berne, where he continued to labour until 1691, in which year, whilst painting a portrait of his wife, he was suddenly attacked by apoplexy, of which he died.

Bordier, in conjunction with whom he worked for fifty years, and who painted the hair, backgrounds, and draperies of his pictures, married his wife's sister. In the museum of the Louvre there is a collection of fifty-six portraits by Petitot; but his principal work is a magnificent whole-length portrait of Rachel de Rouvigny, countess of Southampton, in the collection of the duke of Devonshire, painted from the original in oil by Vandyck, in the possession of the earl of Hardwicke. This enamel is nine inches and three-quarters high, by five inches and three-quarters wide, a prodigious size for a work of this description, and by far the largest that had been then, and for a century and a half afterwards, executed. It is dated 1642. This work was some years ago entrusted to the late Mr. Bone, the enamel painter and royal academician, to repair, it having been seriously damaged by a fall, by which a large portion of the enamel had been displaced. Different from the practice now adopted, the plate on which this was painted is formed upon a very thick piece of gold, the back having cross-bars attached of the same metal, filled up with enamel, the metal alone weighing more than three ounces.

In the earlier part of his career Petitot received twenty guineas for a portrait, which price he afterwards raised to forty. He generally used plates of gold, but seldom copper, and sometimes, it is said, silver, though this seems improbable, for that metal generally has the effect of tinging the enamel with yellow. Amongst a vast number of his works painted in England, we have never met with one the plate of which was composed of silver. His custom was to have a painter to draw the likeness of his sitter in oil, from which he commenced his enamel, and then finished it from life. He copied those of Louis XIV. from the best portraits of him, but generally obtained one or two sittings for the completion.

The pictures which Petitot painted in England are executed in a more free style, and have a greater depth and richness of tint than those executed in France, whilst the latter are remarkable for the extreme delicacy of touch and the exquisitely elaborate finish. He may be called the inventor of enamel painting, for though subjects of fruit and flowers were long before painted on this material for the purposes of jewellery, he was the first who made the attempt to execute pictures, and it was he who at once brought the art to perfection. The principal objection to the tone of colour of his works, a defect observable in the pictures of all other practitioners in enamel till the present century, is a prevalence of purple in the flesh tints.

He had a son, John, who followed this art in England, but his pictures, though possessing great merit, are inferior to those of the father. (Walpole's *Anecdotes of Painting*, by Dallaway; *Biographie Universelle*.)

PETRA (Πέτρα, or αἱ Πέτραι), which lay nearly half way between the Dead Sea and the head of the Ælanitic Gulf, was one of the most important towns in the north of Arabia, and the capital of the Nabathæi. It is in all probability the Sela (סֶלַע) of the Old Testament, which signifies, like the Greek word, a 'rock.' This town, which originally belonged to the Edomites, was taken by Amaziah, king of Judah, who changed its name into that of Joktheel (2 *Kings*, xiv. 7; compare Joseph., *Antiq.*, ix. 9, § 1); but it seems in later times to have belonged to the Moabites. (*Is.*, xvi. 1.)

Petra is described by Strabo (xvi., p. 779) and Pliny (*Hist. Nat.*, vi. 32) as situated on level ground about two miles in size,* and surrounded by precipitous mountains. The town itself was well watered, but the surrounding country, and especially the part towards Judæa, was a complete desert. It was 600 Roman miles from Gaza, and three or four days' journey from Jericho. In the time of Augustus, Petra was a large and important town, and its greatness appears to have been principally owing to its situation, which caused it to be a great halting-place for caravans. A friend of Strabo's, of the name of Athenodorus, who had resided at Petra for many years, informed the geographer that many Romans lived there, as well as other foreigners. (Strabo, xvi., p. 779.) It maintained its independence against the attempts of the Greek kings of Syria (Diod. Sic., xix. 95-97), and was governed by a native prince in the time of Strabo. It was taken by Trajan (Dion Cass., lxviii. 14); and it appears from coins (Eckhel, *Doctr. Num.*, ii. 503) that Hadrian called it after his own name (Ἀδριάνη).

The ruins of Petra still exist in the Wady Musa, two days' journey from the Dead Sea, and the same distance northeast of Akaba. They were visited by Burckhardt in the year 1812, by Captains Irby and Mangles in 1818, and more recently by Laborde. Burckhardt's visit was brief and hasty, but a minute description of the ruins has been given by Captains Irby and Mangles, from whose account we extract the following remarks. The principal entrance to the town appears to have been through a narrow valley formed by the passage of a small rivulet through the rocks, which in some places approach so near to one another as only to leave sufficient room for the passage of two horsemen abreast. This narrow valley extends for nearly two miles; and on each side of it there are numerous tombs cut out of the rocks, which, as you approach nearer the city, become more frequent on both sides, till at length nothing is seen but a continued street of tombs. Nearly at the termination of this valley there are the ruins of a magnificent temple, entirely cut out of the rock, 'the minutest embellishments of which, wherever the hand of man has not purposely effaced them, are so perfect that it may be doubted whether any work of the antients, excepting perhaps some on the banks of the Nile, have come down to our time so little injured by the lapse of age. There is in fact scarcely a building of forty years' standing in England so well preserved in the greater part of its architectural decorations.'

After passing this temple, the valley conducts to the theatre, 'and here the ruins of the city burst on the view in their full grandeur, shut in on their opposite sides by barren craggy precipices, from which numerous ravines and valleys, like those we had passed, branch out in all directions. The sides of the mountains, covered with an endless variety of excavated tombs and private dwellings, presented altogether the most singular scene we have ever beheld, and we must despair of giving the reader an idea of the singular effect of rocks tinted with the most extraordinary hues, whose summits present to us nature in her most savage and romantic form, while their bases are worked out in all the symmetry and regularity of art, with colonnade and pediments, and ranges of corridors adhering to the perpendicular surface.'

The best description of the ruins of Petra is given in Laborde's 'Voyage de l'Arabie Petrée,' Par., 1830, of which an English translation was published in 1836.

PETRARCA, FRANCESCO, born at Arezzo, in July, 1304, was the son of Pietro, or Petracco (an idiomatic form of Pietro), a notary of Florence, who was banished in 1302, at the same time as Dante and others of the Bianchi faction. [DANTE.] The true name of Petrarca was Francesco di Petracco, or 'Francis the son of Petracco,' which he afterwards changed into the more euphonic name of Francesco Petrarca. After losing all hope of being restored to his native town, Petracco removed with his family to Avignon, where Pope Clement V. had fixed the residence of the Papal court, and whither strangers from every country resorted. His son Francesco, after studying grammar and rhetoric, was sent by his father to Montpellier, and afterwards to Bologna to study law, which was considered the most profitable profession. Young Petrarca however had little taste for the law, especially as it was taught in that age, and he devoted much of his time to reading and copying MSS. of the classic writers. His father and mother having died at Avignon nearly about the same time, Petrarca left Bologna, and on his arrival at Avignon he found that his paternal inheritance was but little. He assumed the clerical dress, without however having taken priestly orders, that habit being then, as it still is, the customary dress of good company at the Papal residence. The Papal court of Avignon was very gay and even licentious; and Petrarca, who was then only two and twenty years of age, and of a handsome person, was one of the gayest in the fashionable circles. But his love of pleasure was tempered by the love of study. He contracted a friendship with the jurist Soranzo, with the canon John of Florence, who was apostolic secretary, and with James Colonna, bishop of Lombes in Gascony, and other distinguished men, who were fond of learning, and who supplied him with books, a scarce and expensive commodity in those times. Petrarca accompanied the bishop of Lombes to his diocese at the foot of the Pyrenees, where they spent much of their time in literary discussions and excursions in the mountains, with two other friends of similar tastes, whom Petrarca has recorded under the classical names of Socrates and Laelius (*Trionfo d'Amore*, ch. 4). On his return to Avignon, the Cardinal John Colonna, brother of James, gave Petrarca apartments in his own palace, and became his patron; and when his father, Stephen Colonna, a sturdy warlike old baron, but not illiterate, and well known for his quarrels with Boniface VIII., came from Rome to Avignon on a visit to his sons, Petrarca was introduced to him, and soon won his favour. Petrarca, who was an admirer of the heroes of antient Rome, fancied that he saw in Stephen Colonna their worthy descendant, and in several of his verses, addressed to him, he calls him 'the hope of the Latin name' (*Sonetto* 10). Azzo da Correggio, lord of Parma, having come to Avignon to defend, before Pope Benedict XII., his title to that sovereignty against the claims of Marsiglio Rossi, became acquainted with Petrarca, and prevailed on him to act as his advocate at the Papal chancery. Petrarca undertook the cause and won it. Azzo had brought with him Guglielmo Pastrengo, a learned man of Verona, the author of a work 'De Originibus Rerum,' a kind of historical dictionary in alphabetical order, which is considered the first specimen of that kind of work. Petrarca formed an intimacy with Pastrengo as well as with the Calabrian monk Barlaam, who came to Avignon on a mission from the emperor Andronicus the younger, and from whom he learned the rudiments of Greek. But before this time an incident had occurred which exercised a powerful influence over Petrarca's life.

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* Pliny probably means circumference; he merely says 'amplitudinis.'

On the 6th of April, 1327, while he was attending service in the church of St. Clair, at Avignon, he was struck with the beauty of a young lady who happened to be near him, and he conceived a violent passion for her. The lady's name was Laura. According to the received opinion, supported by documents, for Petrarca himself never mentions her family name, she was the daughter of Audibert of Noves, a small place in the territory of Avignon; she had a considerable fortune, and had been married about two years to Hugh de Sade, a gentleman of Avignon: when Petrarca first saw her, she was nineteen years of age. The attractions of Laura's person have been so fully described and probably exaggerated by Petrarca, that it is needless to say anything on the subject. But the qualities of her mind, which he also praises, seem to have been truly remarkable in a provincial lady of those times and of no very exalted rank. In her conduct for a long course of years towards her handsome, accomplished, and impetuous admirer, whom she could not help meeting wherever she went, at parties of pleasure, in walking, or at church, she exhibited a rare mixture of firmness and courtesy, of respect for her own character with a considerate regard for her enthusiastic lover. She has been called a coquette, but we ought not to judge the conduct of a Frenchwoman of the fourteenth century by the standard of manners in England or even France in the nineteenth century. To those acquainted with the manners of Italy and Spain even at the present day, the passion of Petrarca for Laura de Sade is nothing uncommon. Such attachments are frequent, and though often of a platonic nature, are certainly not always so. That the attachment of Petrarca continued to be platonic, was owing to Laura's sense of duty, or to her indifference, or to both, but that it did not drive her lover to madness and ruin was owing to her consummate address, of which we hav[illegible]abundant evidence in Petrarca's own confessions. When he ventured on a declaration, she sternly rebuked him, and avoided his presence; but when she heard that he was ill, she assumed towards him the manners of a friend interested in his welfare; she succeeded in purifying his passion, and in making him satisfied with her conversation, and with giving vent to his feelings in poetry. (Petrarca's Latin *Epistle to James Colonna, bishop of Lombes.*) She was probably flattered by his praise, which brought no imputation on her character, and made her the most celebrated woman of her day. Petrarca's sonnets and canzoni in praise of Laura circulated throughout Europe. When Charles of Luxemburg, afterwards the emperor Charles IV., came on a visit to Avignon, one of his first inquiries was after the Laura celebrated by Petrarca, and being introduced to her in the midst of a large assembly, he respectfully begged to be allowed to kiss her on the forehead as a mark of his esteem. (Petrarca, *Sonnet* 201.) It was not however without a violent struggle that Petrarca allowed himself to be led by her better judgment. For ten years after he had first seen Laura, his life was one continued strife between his passion and his reason. He left Avignon repeatedly, travelled about, returned, but was still the same. Wishing, if possible, to forget Laura, he formed a connection with another woman, and had by her a son, and afterwards a daughter. But still his mind recurred perpetually to the object of his first attachment. He took care of his illegitimate children, but broke off the connection. For several years he fixed his residence at Vaucluse, a solitary romantic valley near Avignon, on the banks of the Sorga, of which he has given some beautiful descriptions. In a letter addressed to James Colonna, and dated June, 1338, he assigns as a reason for his retirement, that he was disgusted with the vice and dissoluteness of the Papal court of Avignon, in leaving which, he says, he sang to himself the psalm 'In exitu Israel de Ægypto.' He also says, that he was tired of waiting for the fulfilment of the promises of honour and emolument made to him by the pope.

Meantime, year after year rolled on, and the beauty of Laura faded away. She became the mother of a large family. But Petrarca continued to see her with the eyes of youth, and to those who wondered how he could still admire her, he answered:

'Piaga per allentar d'arco non sana.

('The bow can no longer wound, but its mortal blow has been already inflicted. If I had loved her person only, I had changed long since.') In the year 1343, sixteen years after his first sight of Laura, he was writing in the soberness of self-examination: 'My love is vehement, excessive, but exclusive and virtuous.—No, this very disquietude, these suspicions, this watchfulness, this delirium, this weariness of every thing, are not the signs of a virtuous love.' (*De Secreto Conflictu.*)

In the year 1348, while Petrarca was staying in Italy, the plague spread into France and reached Avignon. Laura was attacked by the disease, and she died after three days' illness, on the 6th of April, in the fortieth year of her age. Her death, from the account of witnesses, appears to have been placid and resigned as her life had been. Petrarca has beautifully described her passing away like a lamp which becomes gradually extinct for want of nourishment:

'A guisa d'un soave e chiaro lume
  Cui nutrimento a poco a poco manca.
Pallida nò, ma più che neve bianca,
  Che senza vento in un bel colle fiocchi,
  Parea posar come persona stanca.'
(*Trionfo della Morte*, ch. i.)

When the news reached Petrarca in Italy, he felt the blow as if he had lost the only object that attached him to earth. He wrote on a copy of Virgil, his favourite author, the following memorandum: 'It was in the early days of my youth, on the 6th of April, in the morning, and in the year 1327, that Laura, distinguished by her virtues, and celebrated in my verses, first blessed my eyes in the church of St. Clara, at Avignon; and it was in the same city, on the 6th of the very same month of April, at the same hour in the morning, in the year 1348, that this bright luminary was withdrawn from our sight, whilst I was at Verona, alas! ignorant of my calamity. The remains of her chaste and beautiful body were deposited in the church of the Cordeliers, on the evening of the same day. To preserve the painful remembrance, I have taken a bitter pleasure in recording it particularly in this book, which is most frequently before my eyes, in order that nothing in this world may have any further attraction for me, and that this great bond of attachment to life being now dissolved, I may by frequent reflection, and a proper estimation of our transitory existence, be admonished that it is high time for me to think of quitting this earthly Babylon, which I trust will not be difficult for me, with a strong and manly courage, to accomplish.' Petrarca's 'Virgil,' with this affecting memorandum, is now in the Ambrosian library at Milan. (Valéry, *Voyages Littéraires.*)

Here begins a new period of the life of Petrarca, and with it the second part of his love poetry. Hitherto he had written verses in praise of Laura; he now wrote verses 'on Laura's death.' He fancied himself in frequent communion with her spirit; he describes her appearing to him in the middle of the night, comforting him, and pointing to Heaven as the place of their next meeting. (Sonnet beginning *Levommi il mio pensier*, and the other *Nè mai pietosa madre.*) This delusion, if delusion it be, is the last remaining consolation of impassioned minds which have lost all that they valued in this world; and it has at least one beneficial effect, that of rendering life bearable and preventing despair. The second part of Petrarca's poetry is superior to the first in purity of feeling and loftiness of thought. He himself felt this, and blessed the memory of her who, by the even tenour of her virtue, had been the means of calming and purifying his heart.

'Benedetta colei che à miglior riva
Volse il mio corso, e l'empia voglia ardente
Lusingando affrenò perch'io non pera.' (*Sonnet* 249.)

More than twenty years after Laura's death, when he was himself fast verging towards the grave, and when he was able to think of her with more composure, he drew from his memory a picture of the heart, the principles, and the conduct of the woman who had made all the happiness and all the misery of his life. He describes Laura as appearing to him through a mist, and reasoning with him on the happiness of death to a well prepared mind; she tells him that when she died she felt no sorrow except pity for him. On Petrarca entreating her to say whether she ever loved him, she evaded the question by saying that although she was pleased with his love, she deemed it right to temper his passion by the coldness of her looks, but that when she saw him sinking into despondency, she gave him a look of consolation and spoke kindly to him. 'It was by this alternation of kindness and rigour that I have led thee, sometimes happy, sometimes unhappy, often wearied in truth, but still I have led thee to where there is no more danger, and I have thus saved us both. There has been little difference in our sympathy, except that thou didst proclaim thine to all the world, and I concealed mine. But complaint does not embitter suffering, nor does silence soften it.'

'Non è minore il duol, perch' altri il prema;
Ne maggior per andarsi lamentando.' (*Trionfo della Morte*, ch. ii.)

We have dwelt at some length on this subject because it has acquired an historical importance, and has been the subject of much controversy. Unable to comprehend feelings with which they were unacquainted, some critics have sneered at the passion of Petrarca for Laura; others have doubted its existence; whilst others again have disbelieved the purity of Laura's conduct. We have now however sufficient evidence to establish two facts: 1, that the attachment of Petrarca for Laura was real and lasting; 2, that Laura's conduct was above suspicion. What her inward feelings were towards the poet we have no means of knowing, and Petrarca himself does not seem to have ever known. Laura appears to have been imbued with religious sentiments, united with serenity of mind, self-possession, discretion, and good sense. There have been doubts expressed concerning the identity of the Laura of Petrarca with Laura de Sade, but the evidence seems to be strong in favour of that identity. (De Sade, *Mémoires pour la Vie de F. Pétrarque;* Foscolo, *Essays on Petrarch;* Baldelli, *Del Petrarca e delle sue Opere*, 2nd edition, Fiesole, 1837; and the article 'Noves, Laure de,' in the *Biographie Universelle.*)

But the life of Petrarca was not spent in idle though eloquent wailings. He was an active labourer in the field of learning, and this constitutes his real merit and his best title to fame. Besides the works which he wrote, he encouraged literature in others, and he did everything in his power to promote sound studies. Petrarca was a great traveller for his age; he visited every part of Italy, he went several times to France and Germany, and even to Spain. Wherever he went, he collected or copied MSS., and purchased medals and other remains of antiquity. At Arezzo he discovered the 'Institutions' of Quintilian; at Verona, Cicero's Familiar letters; in another place, the epistles to Atticus; at Liège he found some orations of Cicero, which he transcribed; he also speaks of Cicero's book 'De Gloria,' of Varro's treatise 'De Rebus Divinis et Humanis,' and of a compilation of letters and epigrams of Augustus, which he had once seen or possessed, but which have not come down to us. (*Rerum Memorandarum*, b. i.) He was liberal in lending MSS., and thus several of them were lost. He applied himself also to the diplomatic history of the dark ages, and he investigated the means of distinguishing authentic diplomas and charters from numerous others which were apocryphal. (*Epistolæ Seniles*, b. xv., ep. 5.) He was the friend and instructor of Boccaccio, John of Ravenna, and other Italian and foreign contemporaries. He was the founder of the library of St. Mark at Venice. He encouraged Galeazzo Visconti to found the university of Pavia. In his extensive correspondence with the most distinguished persons of his time, he always inculcated the advantages of study, of the investigation of truth, and of a moral conduct; he always proclaimed the great superiority of intellectual over corporeal pleasures. He and his friend Boccaccio are justly considered as the revivers of classical literature in Italy. His admiration of antiquity was carried to excess, not being tempered by the light of criticism which arose much later in Europe. It was this classical enthusiasm that led him to support the tribune Rienzi, and attach too great importance to his abortive schemes. Petrarca beheld Rome as entitled to be again what she had once been, the mistress of the world, as if the thing were possible, or even desirable. This error he perpetuated by his writings, and his authority has contributed to that classical tendency of recollections and aspirations which has led astray many Italian minds. By aspiring to be what they cannot be again, they have lost sight of what they might and ought to be as members of the great modern European family.

Petrarca acted an important part in the affairs of state of his time. His influence over the great and powerful is one of the most extraordinary parts of his character, but it is a well ascertained fact. He enjoyed the friendship of several popes, of the Correggio lords of Parma, of the Colonna of Rome, the Visconti of Milan, the Carrara of Padua, the Gonzaga of Mantua, of Robert, king of Naples, and of Charles IV., emperor of Germany. He was invited in turn by them all, was consulted by them, and was employed by them in several affairs of importance. He was sent by the nobles and people of Rome as their orator to Clement VI., in order to prevail on that pope to remove his residence from Avignon to Rome. He afterwards wrote a Latin epistle to Urban V., Clement's successor, urging the same request, and the pope soon after removed to Rome, at least for a time. In 1340 the senate of Rome sent him a solemn invitation to come there and receive the laurel crown as a reward of his poetical merit. Petrarca accepted the invitation, and, embarking at Marseille, landed at Naples, where King Robert, himself a man of learning, in order to enhance his reputation, held a public examination in presence of all his court during three days, in which various subjects of science and literature were discussed. At the termination of these meetings, King Robert publicly proclaimed Petrarca to be deserving of the laurel crown, and sent an orator to accompany him to Rome to attend the ceremony, which took place on Easter-day in the year 1341, when Orso dell' Anguillara, senator of Rome, crowned the poet in the Capitol, in presence of a vast assemblage of spectators, and in the midst of loud acclamations.

Petrarca had ecclesiastical benefices at Parma and at Padua, which were given to him by his patrons of the Correggio and Carrara families, and he spent much of his time between those towns. From Padua he sometimes went to Venice, where he became acquainted with the Doge Andrea Dandolo, who was distinguished both as a statesman and as a lover of literature. Venice was then at war with Genoa. Petrarca wrote a letter to Dandolo from Padua, in March, 1351, in which he deprecated these hostilities between two Italian states, and exhorted him to peace. Dandolo, in his answer, praised his style and his good intentions; but he defended the right of Venice, after the provocations that she had received from her rival. In the following year, after a desperate battle between the fleets of the two nations in the Sea of Marmara, Petrarca wrote from Vaucluse, where he then was, to the doge of Genoa, for the same laudable purpose, that of promoting peace. In the next year, 1353, the Genoese fleet was totally defeated by the Venetians off the coast of Sardinia; and Genoa in its humiliation sought the protection of John Visconti, archbishop and lord of Milan, the most powerful Italian prince of his time. Petrarca was staying at Milan as a friend of Visconti, who had made him one of his councillors, and as such he was present at the solemn audience of the deputies of Genoa and at the act of surrender. In 1354 Visconti sent Petrarca on a mission to Venice to negotiate a peace between the two republics. He was received with great distinction, but failed in the object of his mission. Soon after, John Visconti died, and his three nephews divided his dominion amongst them. The youngest and the best of them, Galeazzo, engaged Petrarca to remain at Milan near his person. In November, 1354, the emperor Charles IV. arrived at Mantua from Germany; and he wrote to Petrarca, who had been in correspondence with him before, to invite him to his court. Petrarca repaired to Mantua, spent several days with the emperor, and accompanied him to Milan. Petrarca wished to persuade him to fix his residence in Italy; but the emperor, after being crowned at Milan and at Rome, hastened to return to Germany. However, before he left Italy, peace was proclaimed between Venice and Genoa. In 1356 Petrarca was sent by the Visconti on a mission to the emperor, whom they suspected of hostile intentions towards them. He met Charles at Prague, and having succeeded in his mission, he returned to Milan. In 1360 he was sent by Galeazzo Visconti on a mission to Paris to compliment King John on his deliverance from his captivity in England. In his 'familiar epistles' he describes the miserable state of France, and the traces of the devastation perpetrated by fire and sword. He was well received by the king and the dauphin, and after three months spent at Paris, he returned to Milan. The next year he left Milan to reside at Padua. The introduction into Italy of the mercenary bands, called 'Companies,' which the marquis of Montferrat and other Italian princes took into their pay, and which committed the greatest outrages, and the plague which they brought with them into Lombardy, were the reasons which induced Petrarca to remove to Padua. In 1362, the plague having reached Padua, he retired to Venice, taking his books with him. Soon after his arrival, he offered to bequeath his library to the church of St. Mark. The offer was accepted, and a large house was assigned for the reception of Petrarca and his books. This was the beginning of the celebrated library of St. Mark, which was afterwards increased by Cardinal Bessarion and others. At Venice, Petrarca was visited by his friend Boccaccio, who spent three months in his company. Petrarca passed several years at Venice, honoured by the doge and the principal senators, and now and then making excursions to Padua, Milan, and Pavia, to visit his friends the Carrara and Galeazzo Visconti. In 1368 he was present at the marriage of Galeazzo's daughter Violante with Prince Lionel of England. From Milan he returned to Padua, where he received a pressing invitation from Pope Urban V., who had fixed his residence at Rome, and who wished to become acquainted with him. Petrarca had a great esteem for Urban's character; and he determined, notwithstanding his age and his infirmities, on a journey to Rome; but, on arriving at Ferrara, his strength failed him; he fell into a swoon, and remained for thirty hours apparently dead. Nicholas d'Este, lord of Ferrara, and his brother Hugo, took the greatest care of him, and he was restored to life; but the physicians declared that he was unable to proceed to Rome, and he was taken back to Padua in a boat. Petrarca had been long subject to palpitations and epileptic fits, the consequence of his too great application to study. From Padua he removed, in the summer of 1370, to Arquà, a pleasant village in the Euganean Hills, where he enjoyed a pure air and retirement. He built a house there, and planted a garden and orchard: this is the only residence of the numerous houses which he had at Parma, Padua, Venice, Milan, Vaucluse, and other places, which still remains, and is shown to travellers. In this retirement he resumed his studies with fresh zeal. Among other things, he wrote his book 'De sui ipsius et multorum aliorum Ignorantia,' intended as a rebuke to certain Venetian freethinkers who, inflated with the learning which they had gathered from Averroes' 'Commentaries on Aristotle,' of which a Latin translation had spread into Italy, sneered at the Mosaic account of the creation, and at the Scriptures in general. Four of these young men had sought the society of Petrarca while he resided at Venice, and he was at first highly pleased with them; they were accomplished and witty, and fond of study. But this sympathy did not last long. Petrarca had no blind veneration for Aristotle, and still less for Averroes; he was a believer in the Scriptures, and moreover he had no great bias for natural history, in which his visitors were skilled, and he used to observe to them that it was of greater importance to 'investigate the nature of man than that of quadrupeds, birds, and fishes.' The four admirers of Aristotle were scandalised at his own freethinking concerning their oracle, and they held a kind of jury among them to decide upon the true merits of Petrarca. The verdict was, that Petrarca was a good kind of a man, but destitute of real learning, 'Bonus vir, sine literis.' This judgment spread about Venice, and made a great noise. Petrarca at first laughed at it, but his friends took up the business seriously, and urged him to defend himself, which he did in his retirement at Arquà, by the book already noticed. In this work he acknowledges his own ignorance, but at the same time he exposes the ignorance of his antagonists. With regard to Aristotle he says what others have said after him, that 'he was a great and powerful mind, who knew many things, but was ignorant of many more.' As for Averroës, who discarded all revelation, and denied the immortality or rather the individuality of the human soul, Petrarca urged his friend Father Marsili of Florence to refute his tenets. (*Epistolæ sine Titulo*, the last epistle.) But the tenets of Averroes took root at Venice and at Padua, where many professors, down to the time of Leo X., among others Urbano of Bologna, Nicola Vernia, Agostino Niso, Alessandro Achillini, Pomponacio, and others, professed them, and commented on the works of the Arabian philosopher. It has even been said that Poliziano, Bembo, and others of the distinguished men who gathered round Lorenzo de' Medici and his son Leo X. entertained similar opinions.

The air of the Euganean hills did not prove sufficient to restore Petrarca to health. His physician Dondi told him that his diet was too cold; that he ought not to drink water, nor eat fruit and raw vegetables, nor fast, as he often did. But Petrarca had no faith in medicine. He absolutely wrote four books of invectives against physicians He valued Dondi, not as a physician but as a philosopher and he used to tell him so, but Dondi still remained attached to him. The news of Urban V.'s return to Avignon, and of his subsequent death, caused much grief to Petrarca, who had a great esteem for that pontiff. His successor Gregory XI., to whom he was also personally known, wrote to Petrarca, A.D. 1371, a most kind letter inviting him to his court. But Petrarca was unable to move. He was often seized with fits, and sometimes given up for dead. He wrote to Francisco Bruni, the Apostolic secretary, that 'he should not ask the pope for anything, but that if his Holiness chose to bestow on him a living without cure of souls, for he had enough to take care of his own soul, to make his old age more comfortable, he should feel grateful, though he felt that he was not long for this world, for he was waning away to a shadow. He was not in want; he kept two horses, and generally five or six amanuenses, though only three at the present moment, because he could find no more. He could have more easily obtained painters than transcribers. Although he would prefer to take his meals alone, or with the village priest, he was generally besieged by a host of visitors or self-invited guests, and he must not behave to them as a miser. He wanted to build a small oratory to the Virgin Mary, but he must sell or pledge his books for the purpose.' (*Variarum Epistolarum*, the 43rd.) Some months after (January, 1372), writing from Padua to his old college friend Matthew, archdeacon of Liège, he says, 'I have been infirm these two years, being given up several times, but still live. I have been for some time at Venice, and now I am at Padua, performing my functions of canon. I am happy in having left Venice, on account of this war between the republic and the lord of Padua. At Venice I should have been an object of suspicion, whilst here I am cherished. I spend the greater part of the year in the country; I read, I think, I write; this is my existence, as it was in the time of my youth. It is astonishing that having studied so long, I have learnt so little. I hate no one, I envy no one. In the first season of my life, a time full of error and presumption, I despised everybody but myself; in a more mature age I despised myself alone; in my old age I despise almost everybody, and myself most. . . . Not to conceal anything from you, I have had repeated invitations from the pope, the king of France, and the emperor, but I have declined them, preferring my liberty to all.'

In September, 1373, peace was made between Venice and Francis of Carrara, lord of Padua. One of the conditions was that the latter should send his son to Venice to ask pardon and swear fidelity to the republic. The lord of Padua begged Petrarca to accompany his son. Petrarca appeared before the senate, and pronounced a discourse on the occasion, which was much applauded. After his return to Padua he wrote his book, 'De Republica optime administranda,' which he dedicated to his patron and friend Francis of Carrara.

The following year his health grew worse; a slow fever consumed his frame. He went as usual to Arquà for the summer. On the morning of the 18th of July, one of the servants entered his library and found him sitting motionless, with his head leaning on a book. As he was often for whole hours in that attitude, the people of the house at first took no notice of it, but they soon perceived that their master was quite dead. The news of his death soon reached Padua. Francis of Carrara, accompanied by all the nobility of Padua, the bishop and chapter, and most of the clergy repaired to Arquà to attend the funeral. Sixteen doctors of the university bore his remains to the parish church of Arquà, where his body was interred in a chapel which Petrarca had built in honour of the Virgin Mary. Francesco da Brossano, his son-in-law, raised him a marble monument supported by four columns; and in 1667 his bust in bronze was placed above it. On one of the columns the following distich was engraved:—

Inveni requiem; spes et fortuna valete;
Nil mihi vobiscum est, ludite nunc alios.

Petrarca had had two natural children, a son and a daughter. The son died before his father. The daughter, Tullia, married, in her father's lifetime, Francesco da Brossano, a Milanese gentleman, whom Petrarca made his heir. He left legacies to various friends, and among others to Boccaccio, who did not survive him long. The portraits of Petrarca are numerous, but they differ from one another; that which is considered the most authentic is at

Padua, in the Episcopal palace, above the door of the library. It is a fresco painting, which was cut out of the wall of the house of Petrarca at Padua, when it was pulled down in 1581. (Valéry, *Voyages Littéraires.*) An engraving of it is given at the head of the handsome edition of Petrarca's verses by Marsand.

The works of Petrarca are of three kinds: 1, his Italian poetry, chiefly concerning Laura; 2, his Latin poetry; 3, his Latin prose. His Italian poetry, called 'Il Canzoniere,' or 'Rime di Petrarca,' consists of above 300 sonnets, about fifty canzoni, and three short poems, in terza rima, styled 'Trionfo d'Amore,' 'Trionfo della Morte,' and 'Trionfo della Fama.' Petrarca's 'Canzoniere' has gone through more than three hundred editions, with and without notes and commentaries. The best is that edited by Professor Marsand, 2 vols. 4to., Padua, 1819-20, with a biography of Petrarca, extracted from his own works. The character of his poetry is well known. Its greatest charm consists in the sweetness of numbers, 'enlivened by a variety, a rapidity, and a glow which no Italian lyric has ever possessed in an equal degree. The power of preserving and at the same time of diversifying the rhythm belongs to him alone; his melody is perpetual, and yet never wearies the ear. His canzoni (a species of composition partaking of the ode and the elegy, the character and form of which are exclusively Italian) contain stanzas sometimes of twenty lines. He has placed the cadences however in such a manner as to allow the voice to rest at the end of every three or four verses, and has fixed the recurrence of the same rhyme and the same musical pauses at intervals sufficiently long to avoid monotony, though sufficiently short to preserve harmony. It is not difficult therefore to give credit to his biographer, Filippo Villani, when he assures us "that the musical modulation of the verses which Petrarch addressed to Laura flowed so melodiously, that even the most grave could not refrain from repeating them. Petrarch poured forth his verses to the sound of his lute, which he bequeathed in his will to a friend; and his voice was sweet, flexible, and of great compass."' (Foscolo, *Essays on Petrarch*, 'On the Poetry of Petrarch.') That in Petrarca's sonnets there is too much ornament, that he indulges too much in metaphors, that his antitheses are often forced, and his hyperboles almost puerile, all this is true; and yet there is so much delicacy and truth in his descriptions of the passion of love and of its thousand affecting accessories which he brings before the mind of the reader, that he awakens many associations and recollections in every heart, and this is perhaps the great secret of the charm of his poetry, notwithstanding its perpetual egotism. There is much to choose among his sonnets, many of which, especially those which he wrote after Laura's death, are far superior to the rest in loftiness of thought and expression. He borrowed little from the Latin poets, and much from the Troubadours; but his finest imitations are drawn from the sacred writings. He improved the materials in which the Italian language already abounded, and he gave to that language new grace and freshness. No term which he has employed has become obsolete, and all his phrases may be and still are used in the written language. Far inferior to Dante in invention, depth of thought, and in boldness of imagery, Petrarca is superior to him in softness and melody. Dante was a universal poet; he describes all passions, all actions; Petrarca paints only one passion, but he paints it exquisitely. Dante nerves our hearts against adversity and oppression; Petrarca wraps us in soft melancholy, and leads us to indulge in the error of depending upon the affections of others, and his poetry, chaste though it be, is apt to have an enervating influence on the minds of youth. At a more mature age, when man is sobered by experience, Petrarca's poetry produces a soothing effect, and, by its frequent recurrence to the transitoriness of worldly objects, may even have a beneficial moral influence. There are some of his canzoni which soar higher than the rest in their lyric flight, especially the one which begins 'Italia mia,' and which has been often quoted; and another which he wrote in 1333, when a new crusade was in contemplation. His beautiful canzone, or 'Ode to the Virgin,' with which he closes his poetry about Laura, is also greatly admired for its sublimity and pathos.

Petrarca's Latin poetry consists, 1, of the 'Africa,' an epic on the exploits of Scipio in the second Punic war, a dull sort of poem, with some fine passages: it was however much admired at the time; 2, Epistles, in verse, addressed to several popes, for the purpose of urging their return to Rome, and also to several friends; 3, Eclogues or Bucolics, which are acknowledged by himself to be allegorical, and were in fact, like Boccaccio's eclogues, satires against the powerful of his time, and especially against the Papal court of Avignon.

Ginguené, in his 'Histoire Littéraire,' and others, have endeavoured to find the key to these allegories. The sixth and seventh eclogues are evidently directed against Clement VI., and the twelfth, entitled 'Conflictatio,' has also some violent invectives against the Papal court. This circumstance has given rise to strange surmises, as if Petrarca were a secret heretic, an enemy of the church of Rome, belonging to some supposed secret society. We know from Petrarca's own letters, especially those styled 'sine titulo,' that he spoke very plainly to his friends concerning the disorders and vices of the Papal court, which he called the modern Babylon, the Babylon of the west. He says that Jesus Christ was sold every day for gold, and that his temple was made a den of thieves; but we also evidently see that in all these invectives he spoke of the discipline of the Church, or rather of the abuses of that discipline, and not of the dogmas, things which have been often confounded, both by the advocates and the enemies of Rome. Petrarca, like many other observing men of that and the succeeding century, could not be blind to the enormous abuses existing in the Church; but their indignation was poured out against the individuals who fostered those abuses, and they never thought of attacking the fabric itself. This was especially the case in Italy. There might be in that country secret unbelievers and scoffers at revelation, but there were no heretics. There were many who openly charged the pope and his court with heinous crimes, but who at the same time felt a sort of loathing at the very name of heretic or schismatic. The influence of traditional veneration for the authority of the Church, the persuasion of its infallibility, remained, although divested of all devotion, of all enthusiasm, of all respect even for the person of the head of that Church.

Petrarca was not a man of extremes: his dislike of the Papal court of Avignon originated in two feelings, one of honest indignation against its corruptions, and another of national or rather classical attachment to Rome, which made him urge with all his powers of persuasion the return of the head of the Church to a residence in that city. When he spoke of Babylon, he alluded to the captivity of the Jews, to which he compared the residence of the popes at Avignon. Of several popes, such as Urban VI. and Gregory XI., he speaks in his letters with great respect and personal attachment. He went to Rome expressly to attend the jubilee of 1350, and, as he states in his letters to Boccaccio (*Epistolæ Familiares*), for the sake of obtaining the plenary indulgence, and 'with a firm resolve of putting an end to his career of sin.' He had an accident on the road, which made him lame, and which he said was a salutary punishment for his sins. He gives some account of that jubilee, and of the vast number of pilgrims who resorted to Rome on the occasion. After having visited the churches and performed his devotions, he wrote that 'he had now become free from the plague of concupiscence, which had tormented him till then, and that in looking back to his past life, he shuddered with shame.' (*Epistolæ Seniles*, viii. 1.) So much for those who would persuade us that Petrarca was a concealed heretic. His hostility was local and personal; it was directed against Avignon, and not against Rome; against the corrupt dignitaries of the church, not against the Church itself. Petrarca however, although religiously disposed, was far from superstitious. He was one of the few of his age who spurned astrology, and yet, strange to say, a cardinal had nearly persuaded Pope Innocent VI. that he was a magician, because he was familiar with strange books, a very serious charge in those times. Petrarca's letter of advice to Boccaccio, when he thought of turning monk, is a lasting monument of sound religion and good sense.

The Latin Epistles of Petrarca are the most important of his prose writings. We have no Italian prose of his except two or three letters to James Colonna, the autographs of which are now in the possession of Lord Holland, and which show that he was not much in the habit of corresponding in that language. Petrarca's Epistles are very numerous; they embrace a stormy and confused period of nearly half a century, for the history of which many of them afford ample and trustworthy materials. Petrarca was one of the earliest and most enlightened travellers of modern Europe; he was an eye-witness of many important events; he corresponded with kings, emperors, popes, statesmen, and men of learning. His Letters have not been sufficiently noticed by historians: many of them are scattered MSS. in various libraries, and we have no complete edition of them arranged in order of time. Those which have been published are classed as follows:—1, 'Epistolæ de Rebus Familiaribus,' in viii. books; 2, 'De Rebus Senilibus,' written in Petrarca's old age, in xvi. books; 3, one book 'Ad Viros quosdam ex Veteribus Illustriores;' these epistles are addressed to various historical characters of antiquity; 4, one book 'Variarum Epistolarum;' 5, one book 'Epistolarum sine Titulo.' To this last book Petrarca had prefixed a curious preface, in which he says, 'that well knowing truth to be odious to the world, especially in times of corruption, he had taken the precaution of writing the Bucolics in an ambiguous kind of style, in order that their real sense might be understood only by the few, and that for a similar consideration he now has collected in one separate book certain letters written to several friends at various times and upon different occasions, in order that they might not be scattered through the body of his correspondence, and be the means of having the whole condemned. Those who wished to read them would thus know where to find them, and those who thought that they ought to be suppressed, might exclude them from the rest of the collection.'

Professor Levati, of Milan, has composed out of the Epistles of Petrarca a work descriptive of the manners and history of his age, in which he gives copious extracts translated into Italian: 'Viaggi di Francesco Petrarca in Francia, in Germania, ed in Italia,' 5 vols. 8vo., Milan, 1820. This work was severely criticised in the 'Biblioteca Italiana,' vol. xxiii. and xxiv. It is however an entertaining book, containing considerable information concerning Petrarca and his times which is not collected in any other work. Professor Meneghelli, of Padua, published in 1818, 'Index F. Petrarchæ Epistolarum quæ editæ sunt, et quæ adhuc ineditæ;' but his list, as he himself admits, is not complete. Domenico de' Rossetti, of Trieste, has published a bibliography of the works of Petrarca, their various editions, commentators, &c., and he has also edited a biography of Petrarca by his friend Boccaccio. 'Serie cronologica di edizioni delle Opere di Petrarca,' Trieste, 1834.

The prose works of Petrarca, besides those already mentioned, are: 1, 'De Remediis utriusque Fortunæ,' libri ii.; 2, 'De Vitâ Solitariâ,' lib. ii.; 3, 'De Otio Religiosorum,' lib. ii.; 4, 'Apologia contra Gallum;' 5, 'De Officio et Virtutibus Imperatoris;' 6, 'Rerum Memorandarum,' libri iv. In this work, in which he has imitated Valerius Maximus, without however borrowing from him, Petrarca quotes a vast number of facts from antient and modern history, each illustrative of some principle of moral philosophy; it is in fact a treatise of practical ethics. 7, 'De verâ Sapientiâ,' being dialogues between a sophist and an uneducated man. 8, 'De Contemptu Mundi,' being imaginary dialogues between the author and St. Augustin. Petrarca had studied the Latin fathers attentively. 9, 'Vitarum Virorum illustrium Epitome.' Another and ampler work of Petrarca under the same title, of which the one just mentioned is only an abridgement, has remained inedited, but an imperfect Italian translation, by Donato degli Albanzoni, was published at Venice, in 1527. (D. de Rossetti, *Petrarca, Giulio Celso, e Boccaccio, illustrazione Bibliologica,* Trieste, 1828.) 10, 'De Vitâ Beatâ.' 11, 'De Obedientiâ ac Fide Uxoriâ.' 12, 'Itinerarium Syriacum.' 13, Several orations, 'De Avaritiâ vitandâ,' 'De Libertate capescendâ,' &c. Of his Latin style the following judgment is given by an Italian scholar: 'In modelling his style upon the Roman writers, he was unwilling to neglect entirely the Fathers of the Church, whose phraseology was more appropriate to his subjects; and the public affairs being, at that period, transacted in Latin, he could not always reject many of those expressions which, although originating from barbarous ages, had been sanctioned by the adoption of the universities, and were the more intelligible to his readers. In sacrificing gravity he gained freedom, fluency, and warmth; and his prose, though not a model for imitation, is beyond the reach of imitators, because it is original and his own.' (Foscolo 'On the Poetry of Petrarch.') Petrarca's 'Opera Omnia' were published at Basle, in 1581, 2 vols. folio. Biographies of Petrarca have been written by Villani, Vergerio, Tomasini, Leonardo Aretino, and many others: the best are—Baldelli 'Del Petrarca e delle sue Opere,' 2 vols. 8vo.; 'Mémoires pour la Vie de Petrarque, avec des Pièces justificatives,' 3 vols. 4to., Amsterdam, 1746; Foscolo, 'Essays on Petrarch.'

PETRELS, the English name for the *Procellaridæ*, a family of oceanic birds, well known to the seaman when far from the land, and with which his superstition was once more busy than it is now; but even at the present day they are not unfrequently regarded as ominous, and many a hard-a-weather old quarter-master still looks upon *Mother Carey's Chickens* as the harbingers of a storm.

Though zoologists have differed as to the genera to be included in this extraordinary group, they have been pretty well agreed as to the forms which should be congregated in it.

The genus *Procellaria* of Linnæus was formed by that great zoologist for the *Petrels*, and it is closely followed by his genus *Diomedea* (Albatrosses), between which and the *Petrels* there are many points of resemblance both in their structure and their pelagic habits. In the article LARIDÆ, to which family so many ornithologists have referred the *Petrels*, will be found the opinions of most of the leading writers who had then written upon the subject.*

The Prince of Musignano (*Geographical and Comparative List*, 1838) makes the *Procellaridæ* the thirty-fourth family of the birds, and places them between the *Laridæ* and the *Colymbidæ*. The Prince's *Procellaridæ* (European and American only) consist of the genera *Diomedea, Procellaria, Puffinus,* and *Thalassidroma.*

Mr. G. R. Gray (*List of the Genera of Birds*, 1840) makes the *Diomedeinæ* the first subfamily of the *Laridæ*. This subfamily comprehends the genera *Pelecanoides, Puffinus, Daption, Thalassidroma, Wagellus,*† *Procellaria, Diomedea,* and *Prion.*

M. Temminck, in his 'Manuel' (2nd part, 1820), arranges all the *Petrels* under the generic name *Procellaria*, Linn., but divides them into the following sections:—

1.

Petrel properly so called.

Procellaria glacialis.

2.

Procellariæ Puffinus, Anglorum, and *obscura.*

3.

Swallow-like Petrels (Pétrels ndelles).

Procellariæ Pelagica and *Leachii.*

In the 4th part of his 'Manuel' (1840), Temminck admits the genera *Procellaria, Puffinus,* and *Thalassidroma.*

Pelecanoïdes. (Lacépède.)

This is the genus *Haladroma* of Illiger, and the genus *Puffinuria* of Lesson.

The last-named author states that his reason for changing the generic name of the only species which serves as the type of this genus is the uncertainty in which he finds himself as to what is really the genus *Pelecanoïdes* of Lacépède, or *Haladroma* of Illiger. Some strong shades of difference, he observes, appeared to exist between the characters given by these authors and those which he cites, and he further says that he has seen nothing of the small membranous and dilatable pouch, which ought to exist under the lower mandible. The sole species above alluded to he records as *Puffinuria Garnoti*, Less. (*Zool. de la Coq.*, pl. 46; *Procellaria urinatrix*, Gmel.?)

Mr. G. R. Gray gives *Procellaria*, Gm., *Haladroma*, Ill., and *Puffinuria*, Less., as synonyms of *Pelecanoïdes;* and refers, without a query, to *P. Urinatrix*, Gm. (Forst., *Draw.*, t. 88—from which our cut is taken) as the species.

Generic Character.—Bill enlarged, composed of many pieces soldered together, the edges smooth and re entering; the upper demi-bill composed of two pieces, furnished with feathers at the base up to the nostrils, which are very open, forming an oval circle, the aperture of which is above, separated one from the other by a simple internal partition; this partition supports a slight ledge which divides each nasal fossa in half; the enlarged portion of the upper demi-bill goes beyond the lower mandible, and terminates at the contraction of the bill, which is narrow, convex, very much curved, and very robust. The lower mandible is formed equally of two soldered pieces; that of the edge is narrow, inserted in the upper demi-bill; that below is formed by two branches, slightly convex, separated outwards, where the space is filled by a very small and rather indistinct naked skin; the extremity of the mandible is convex on the edges, concave below, and sharp. First and second *quills*, which are the longest, equal; third and fourth rather shorter. *Tail* small, nearly equal, pointed, formed of twelve feathers. *Tarsi* moderate, weak, furnished with small areolated scutella; three anterior toes enveloped in an entire membrane; hind-toe wanting. (Less.)

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* In the article LARIDÆ, vol. xiii., p. 333, right-hand column, line 35 from the top, for 'Heroudelles,' read 'Hiroudelles.'

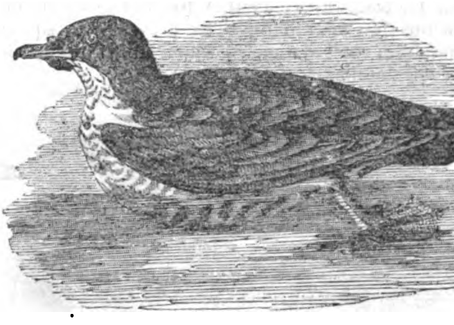
† See post. p. 45.

M. Garnot describes the sole species above noticed, as follows:—Size of the *Blue Petrel*, from the extremity of the bill to the tail, 8½ inches. The plumage has no brilliancy; a blackish-brown on the upper part of the back glazed with a slight tint of blue and a lustrous white on all the foreparts of the body are the two colours which it presents. Beneath the wings, as well as on the sides, the hue is greyish-white.

The head approaches, a little, that of the Pelagic Petrel; the bill is articulated and hooked like that of the Puffins, but differs from that genus in the aperture of the nostrils, which is turned upwards in the form of a heart on a playing card; a partition separates the two nasal conduits; the colour is black; the palmated feet, which want the hind-toe, are of the same colour, and are placed very near the tail, which is intermediate between that of the *Petrels* and the *Grebes*. The eye, which is situated a little above the level of the commissure of the mandibles, has the iris of a red-brown. Total length 8 inches 6 lines.

M. Garnot further describes the tongue as elongated, thick, and dentilated on its edges; the stomach large and occupying nearly the whole abdominal cavity, measured from the cardiac to the pyloric orifice three inches and some lines. The intestine, which forms many duplicatures, or folds, is from 21 to 22 inches long. The two *cæca* are scarcely perceptible. The stomach was full of an oily grey matter, and its internal surface was covered with mucous follicles: the very small gizzard is composed of muscular fibres united by a cellular tissue not of a close texture. The liver, which has not much volume, is divided into two parts. The spleen is very small. The pancreas is but little developed. The testicles were rounded, yellow, and of the size of peas. The larynx, which is three inches long, has no partition in the lower portion, whence M. Garnot concludes that there is no lower larynx; two muscles are there fixed. The heart is small.

Locality and Habits.—This species is found in great flocks along the coast of Peru, flying moderately well in a precipitous manner, and skimming the sea, but it prefers repose on the surface, and dives very frequently, like the Grebes, doubtless for the purpose of capturing the small fish which form its food. M. Garnot thinks that it is intermediate between the *Petrels*, whose bill and feet it very nearly possesses, and the *Grebes*, whose port and habit of diving it has; and hence he proposes for it the name of the *Grebe-Petrel*. The parts between Sangallan and Lima are the localities mentioned by M. Garnot



Pelecanoides Urinatrix.

Mr. Darwin notices *Puffinuria Brerardii* as one more example of those extraordinary cases of a bird evidently belonging to one well-marked family, yet both in its habits and structure allied to a very distinct tribe. 'This bird never leaves the quiet inland sounds,' says Mr. Darwin; 'when disturbed, it dives to a distance, and on coming to the surface with the same movement takes wing. After flying for a space in a direct course, by the rapid movement of its short wings, it drops as if struck dead, and then dives again. The form of the beak and nostrils, length of foot, and even colouring of the plumage, show that this bird is a petrel; at the same time, its short wings and consequent little power of flight, its form of body and shape of tail, its habits of diving, and the absence of a hind toe to its foot, and its choice of situation, make it doubtful whether its relationship is not equally close with the auks as with the petrels. It would undoubtedly be mistaken for one of the former, when seen either on the wing, or when diving and quietly swimming about the retired channels of Tierra del Fuego.' (*Journal and Remarks.*) Prior as is the claim of Lacépède's generic name, there can be no doubt that M. Lesson's designation is much more consonant to the habits of the bird.

Puffinus. (Ray.)

Generic Character.—General characters those of the true Petrels, from which *Puffinus* is distinguished by the bill being longer, by the extremity of the lower mandible, which follows the curvature of the upper, and by the tubular nostrils opening not by a common aperture, but by two distinct orifices.

This is the genus *Thiellus* of Gloger, *Thalassidroma*, Sw., and *Nectris*, Klug.

Example, *Puffinus Anglorum*.

Summit of the head, nape, and all the upper parts of the body generally, the wings, the tail, the thighs, and the borders of the lower tail-coverts, of a lustrous black; all the lower parts of a pure white; the black and white of the sides of the neck are in demi-tints which produce a kind of crescents; bill blackish-brown; feet and toes brown, membranes yellowish. Length nearly 13 inches. Male and female. (Temminck.)

In the 4th part of his 'Manuel,' M. Temminck observes that the natural colour of the feet being badly indicated, he gives it from Graba. The trenchant posterior border of the tarsi and the external toe are deep brown; the other parts of the tarsus are flesh-coloured, and the membranes of a livid tint with brown streaks. Iris deep brown.

Young of the Year.—All the lower parts of a more or less deep ash-colour.

This is the *Procellaria Puffinus* of Brunnich and Latham, *Puffinus Arcticus* of Faber, *Der Nordische und Englische Sturmtaucher* of Brehm, *Pétrel Manks* of Temminck, *Purffingen Fanaw* of the antient British, and *Shearwater Petrel*, *Manks Puffin*, and *Manks Shearwater* of the moderns.

Localities; Habits; Utility to Man; &c.—Willughby says:—'At the south end of the Isle of Man lies a little islet, divided from Man by a narrow channel called the Calf of Man, on which are no habitations, but only a cottage or two lately built. This islet is full of conies, which the Puffins, coming yearly, dislodge, and build in their burroughs. They lay each but one egg before they sit, like the *Razorbill* and *Guillem*, although it be the common persuasion that they lay two at a time, of which the one is always addle. They feed their young ones wondrous fat. The old ones early in the morning, at break of day, leave their nests and young, and the island itself, and spend the whole day in fishing in the sea, never returning or once setting foot on the island before evening twilight; so that all day the island is so quiet and still from all noise, as if there were not a bird about it. Whatever fish or other food they have gotten and swallowed in the day-time, by the innate heat or proper ferment of the stomach is (as they say) changed into a certain oily substance (or rather chyle), a good part whereof in the night-time they vomit up into the mouths of their young, which, being therewith nourished, grow extraordinarily fat. When they are come to their full growth, they who are intrusted by the lord of the island (the earl of Darby) draw them out of the cony-holes; and that they may the more readily know and keep an account of the number they take, they cut off one foot and reserve it, which gave occasion to that fable, that the Puffins are single-footed. They usually sell them for about ninepence the dozen, a very cheap rate. They say their flesh is permitted to be eaten in Lent, being for the taste so like to fish. We are told that they breed not only on the Calf of Man, but also on the Scilly Islands. Notwithstanding they are sold so cheap, yet some years there is thirty pounds made of the young Puffins taken in the Calf of Man, whence may be gathered what number of birds breed there.' Speaking of the flesh, the same author says, that from its extraordinary fatness, it is esteemed unwholesome meat, unless it be well seasoned with salt. Pennant states that they are salted and barrelled, and when they are boiled, are eaten with potatoes. He further says that they quit the isle the latter end of August or beginning of September; and from accounts then lately received from navigators, he observes that he has reason to imagine that, like the Storm-finch, they are dispersed over the whole Atlantic Ocean. He says it inhabits also the Orkney Isles, where it makes its nest in holes in the earth near the shelves of the rocks and headlands; it is, he says, called there the *Lyre*, and is much valued, both on account of its serving as food and for its feathers. The inhabitants, he adds, take and salt them in August for winter provisions, when they boil them with cabbage: they also take the old ones in March; but they are then poor, and not so well tasted as the young, and he makes their first appearance to be in February.

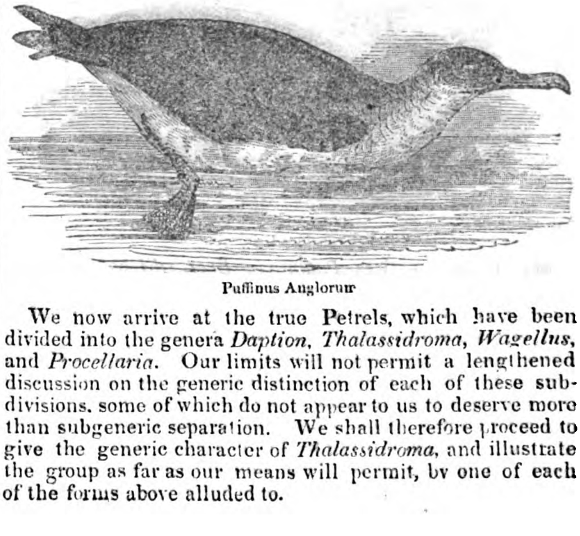
Mr. Selby (*Illustrations of British Ornithology*), who gives *Lyre*, *Shearwater*, and *Scrabe* as the provincial names of the bird, remarks, that from the accounts transmitted to us by the authors above quoted, this species appears, at the time they wrote, to have resorted in great numbers to the Calf of Man; but from the information which Mr. Selby obtained, confirmed by the testimony of Sir W. Jardine (who visited the Isle of Man a few years ago with the express view of ascertaining this and some other points connected with ornithology), it seems now to be entirely deserted by those birds, a circumstance in all probability occasioned by the wanton and greedy destruction of their eggs and young. Mr. Selby, not having extended his inquiries to the Scilly Islands, is unable to say whether it is now to be found there; but he states that it is still abundant in the Orkneys, where it breeds in holes scratched in the earth that fills up the interstices of the rocks and bold headlands, and is, according to Low, the main object of pursuit with the *Rockmen*, who endanger their lives in climbing the most awful precipices for the eggs and young of water-fowl. 'Like the rest of the genus,' continues Mr. Selby, 'this bird lays but one white egg, of a rounded form, being equally obtuse at each end, and not inferior in size to that of a domestic fowl. It arrives at its breeding station in February or March; and soon after August, when its young is able to fly, deserts it for the open sea, migrating, as the winter approaches, in a southerly direction towards the coast of Spain, the Mediterranean, &c. In Britain it is almost entirely confined to the western coast, being of very rare occurrence on the eastern, where I have only met with one individual, which was shot upon an excursion to the Fern Islands.' The same author thinks that Willughby and Pennant are mistaken in attributing the stillness observed in the Calf of Man during the day to the absence of the birds at sea, the real cause, in Mr. Selby's opinion, being the repose of the birds in their burrows to prepare for their activity at evening twilight and morning dawn.

Mr. Gould (*Birds of Europe*) remarks that it is evident Mr. Selby is not aware that this species is, during the summer months, nearly as abundant on the coasts of South Wales as it formerly was in the Calf of Man. Four dozens, apparently captured by hand, were sent to Mr. Gould from this locality, with an intimation that he could have as many more. It appeared from the information obtained by him, that the birds visit these localities for the purpose of incubation during the early part of the spring, when they resort to deserted rabbit-burrows, crevices of the rocks, &c., wherein they deposit their single white egg, and the birds then fall an easy prey to the fishermen and others. He further says that they retire southwards, after the breeding season, even beyond the Mediterranean, where, in consequence of the increased temperature, they find a greater supply of food. The coasts of Norway and the shores of the Baltic, he adds, although not without the presence of this species, appear to be much less frequented by it than our own islands. M. Temminck, in the 2nd part of his 'Manuel,' mentions Ireland* as one of the localities, and notes the species as found on the coasts of Norway, according to the testimony of some voyagers, but not in the Baltic, and rarely on the coasts of Holland and France. In the 4th part of the same work, he states that it is common in the Feroe Isles; and that it migrates in more or less considerable numbers along our maritime coasts, mentioning it as rare in Iceland, and as not visiting the coasts of Norway. He adds that it is common on the banks of Newfoundland, and that it is also found in the south, for it is accidentally seen in the Mediterranean. He received an individual killed on the Bosphorus, and another from the Adriatic; the only difference was in the slenderness of the bill as compared with northern specimens. Mr. Gould figures three species in his great work (*Birds of Europe*): the bird above described; the *Dusky Shearwater* (*Puffinus obscurus*); and the *Cinereous Shearwater* (*Puffinus cinereus*), Stephens. With regard to the last, Mr. Gould remarks, that if it should ultimately appear that the bird obtained by Mr. Strickland from the Tees mouth, and characterised by him as a new species under the name of *Puffinus fuliginosus* (*Zool. Proc.*, 1832), is identical with the young of *Puffinus cinereus*, which is by no means unlikely, and if a bird apparently in the adult plumage, subsequently obtained by the same gentleman, should prove to be the adult of this species, we shall have, with the addition of a specimen obtained by Mr. Selby, three examples of British-killed specimens of this genus. Mr. Gould further observes with respect to the specimens forwarded by Mr. Strickland, and which he has figured, that these two birds, although agreeing in their admeasurements with each other, differ slightly from a specimen of *Puffinus cinereus* sent to Mr. Gould by M. Temminck as an undoubted example of that species, Mr. Strickland's specimens being less in all their admeasurements; and Mr. Gould adds, that if he could have discovered any difference in the markings of their plumage, he should have had no hesitation in regarding them as distinct: as it is, Mr. Gould figures Mr. Strickland's specimens, a young one and an adult, as *Puffinus cinereus*, with a ? M. Temminck refers to Mr. Gould's figure of the adult for *Puffinus cinereus*, without any mark of doubt.

Puffinus cinereus, according to Mr. Darwin, is common to Cape Horn and the coast of Peru, as well as Europe, and generally frequents the inland sounds. 'I do not think,' adds Mr. Darwin, 'I ever saw so many birds of any other sort together, as I once saw of these behind the island of Chiloe; hundreds of thousands flew in an irregular line for several hours in one direction. When part of the flock settled on the water the surface was blackened, and a noise proceeded from them, as of human beings talking in the distance. At this time the water was in parts coloured by clouds of small crustacea. At Port Famine, every morning and evening, a long band of these birds continued to fly with extreme rapidity up and down the central parts of the channel. I opened the stomach of one (which I shot with some difficulty, for they were very wary), and it contained a small fish and seven good sized prawn-like crabs. (*Journal and Remarks*.)

Mr. Gould describes a species, *Puffinus Affinis*, from New South Wales. (*Zool. Proc.*, 1837.) It is closely allied to *P. obscurus*, but somewhat smaller.

The Shearwaters generally have the wings well developed and fly rapidly, skimming over the waves, whence they pick up small fishes, crustaceans, mollusks, and in short any marine animals which they can master. While thus employed they approach nearly in their habits to the true Petrels, spurning as it were the water with their feet (which are placed far backwards) as they fly, and using them as a support while they snatch up their prey. They squirt the oily matter from their stomachs, when surprised by an intruder, in self-defence.



Puffinus Anglorum

We now arrive at the true Petrels, which have been divided into the genera *Daption*, *Thalassidroma*, *Wagellus*, and *Procellaria*. Our limits will not permit a lengthened discussion on the generic distinction of each of these subdivisions, some of which do not appear to us to deserve more than subgeneric separation. We shall therefore proceed to give the generic character of *Thalassidroma*, and illustrate the group as far as our means will permit, by one of each of the forms above alluded to.

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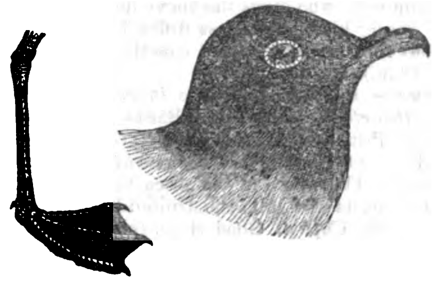
* The Cinereous Shearwater (*Procellaria Puffinus*, Linn.) is noted as an Irish bird by Mr. Thompson. It was taken in August, 1835, by a boy who saw it scrambling towards a hole at the base of a cliff near Dungarvan, county of Waterford. They are called *hagdowns* by the fishermen. (*Zool. Proc.*, 1837.)

Generic Character of Thalassidroma.—*Bill* shorter than the head, much compressed in front of the nasal sheath, with the tip of the upper mandible suddenly curving and hooking downwards, and that of the lower one slightly angulated and following the curve of the upper. *Nostrils* contained in one tube or sheath, but showing two distinct orifices in front. *Wings* long and acuminate, with the first quill shorter than the third, the second being the longest. *Tail* square or slightly forked. *Legs* having the tarsi rather long and slender, reticulated. *Feet* of three toes united by a membrane; hind toe represented by a small straight dependent nail. (Gould.)

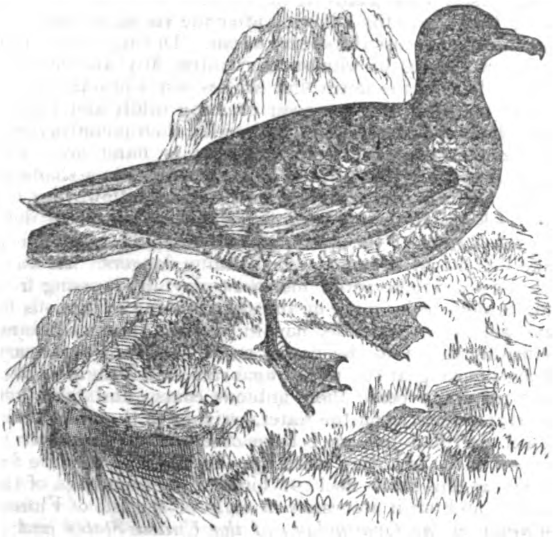


Head and foot of Thalassidroma pelagica.

The group generically subdivided as above, or rather the most of them, have been regarded as the indicators of storm and tempest. Rapidly spurning the billows as they skim along the undulating waves, they are ever on the watch for what the troubled water may offer to them, and they congregate in the wake of the sea-going ship not so much perhaps for shelter as for what is turned up from the furrow ploughed by the keel. Mr. G. Bennett, during his voyage, observed that the Cape Petrels, Albatrosses, and other birds followed the ship during the whole of the night, reposing for a short period on the water, but seldom remaining long on the waves. They usually alighted for food, and soon resumed their flight. Marked birds were seen about the ship for days together when the strong gales carried the vessel at a rapid rate through the water. Cape Petrels and Albatrosses were seen flying near the stern as late as midnight, and it was not unusual to hear the twittering note of the Stormy Petrel (*Thalassidroma pelagica*) under the stern during the night. (*Wanderings in New South Wales*, vol. i.)

Daption.

Example, *Daption Capensis*, Stephens; *Procellaria Capensis*, Linn.; *Cape Pigeon* of the English; *Peintada* of the Portuguese.



Daption Capensis.

Description.—Plumage variegated with brown and white. The total length of one measured by M. Lesson was thirteen inches, that of the tube of the nostrils six lines. The testicles were rather deep grey, the larynx had two muscles proper to it, and the total length of the intestinal tube was 47 inches. M. Garnot communicated to M. Lesson a species which the latter believed to be new, with an elaborate description and anatomical details, which M. Lesson quotes at length.

Captain P. P. King, in a letter to Mr. Broderip from New South Wales (April, 1834), states that from the meridian of the island of St. Paul's, on about the parallel of 40° S. lat., the ship was daily surrounded by a multitude of oceanic birds. Of the *Petrel tribe*, the *Cape Pigeon*, *Procellaria Capensis*, Linn., was most abundant; but *Proc. vittata* (vel *cærulea*)—*Prion*—frequently was observed; as was also a small black Petrel which Captain King did not recollect to have before seen. (*Zool. Proc.*, 1834.) The same author states that the *Pintado Petrel* (the species now under consideration), seems to be spread over the whole of the southern hemisphere. (*Zool. Journ.*, vol. iv.)

Thalassidroma. (Vigors.)

This is the genus *Hydrobates* of Boie.

Mr. Selby remarks that the members of this genus, which are all of small size, have been very properly separated by Mr. Vigors from the rest of the Petrel group. They are, he observes, birds of nocturnal or crepuscular habits, and are seldom seen except in lowering weather, or during storms, when they frequently fly in the track of ships. At other times, and in clear weather, they remain concealed during the day in the holes of rocks, rat-burrows, &c., and only come forth at nightfall in search of food, consisting of marine crustaceans, small mollusks, and other oily animal matter which they find floating on the surface of the ocean. Their flight equals in swiftness that of the Swallow tribe, which they resemble in size, colour, and general appearance. All the known species are of a dark hue, more or less relieved with white, and are widely distributed, some being found in both hemispheres, and in a variety of climate. They breed in the crevices of rocks, caverns, &c., and, like the *Fulmars* and *Shearwaters*, lay but one egg, which is white, and comparatively large. (*Illustrations of British Ornithology*, vol. ii.)

Examples. — *Thalassidroma pelagica*, and *Thalassidroma Wilsonii*.

Description of Thalassidroma pelagica.—Head, back, wings, and tail dull black; lower parts sooty black; a large transverse band of pure white on the rump; scapulars and secondary quills terminated with white; tail and quills black, the first quill not the longest, but shorter by four lines than the second and third, which is the longest; bill and feet black; iris brown. The tail is square, and the tips of the wings reach but very little beyond its point. The length of the tarsi is ten lines. Total length five inches six lines. (Male and female.)

Young of the Year.—These have the tints less deep, and the edges of the feathers sooty or rusty: in other respects they resemble the adults.

Localities.—More common in North America than in Europe; found on the coasts of England and Scotland; rather common at the Orcades and Hebrides; more abundant in the island of Saint Kilda; wanders rarely on the coasts of the ocean, and very accidentally on the lakes of the centre of Europe. (Temminck.) Mr. Selby states that they are found upon the seas surrounding Britain at all seasons of the year, and that they have been ascertained to breed not only upon the Shetland and other northern islands of Scotland, but upon the rocky coast of the north-west of Cornwall at the opposite extremity of the kingdom. The geographical distribution of this species has, he adds, been supposed to be very extensive, but the discovery of other species very closely allied to it both in size and colour (and only to be distinguished by narrow inspection and comparison) in various parts of the Atlantic and Pacific Oceans, makes it more than probable that these latter have been mistaken for it, and that its distribution is in fact much more limited, being in all likelihood confined to the European seas.

The bird above described, which is considered to be the smallest of the web-footed birds, is the *Procellaria pelagica* of Linnæus; *Uccello delle Tempeste* of the modern Italians; *Oiseau de Tempête*, *Pétrel*, and *Pétrel Tempête* of the French and Temminck; *Ungewitter Vogel*, *Kleinster Sturmvogel*, and *Meer Peters Vogel* of the Dutch; *Storm Zwalu* of the Netherlanders; *Stromwaders Vogel* of the Swedes; *Soren Peder*, *St. Peders Fugl*, *Vestan-vinds* or *Sonden-vinds Fugl*, and *Uveyrs Fugl* of the Norwegians; *Cas gan Longwr* of the antient British; *Common Storm Petrel*, *Stormy Petrel*, and *Storm-finch* of the modern

British, who call the species also (provincially) *Little Petrel, Mitty, Assilag, Spency, Sea-swallow, Allamouty, Witch*, and (mariners especially) *Mother Carey's Chickens*, a title which is not confined to *Procellaria pelagica*, but is shared by and more generally applied to the more oceanic species, such as *Thalassidroma Wilsonii*, &c.

This, or some other species of *Thalassidroma*, is in all probability the *Cypselus* of Pliny, who describes (*Nat. Hist.*, x. 39) the swallow-like appearance of his *Cypseli*, their nesting in rocks, their wide spread over the sea, and says that however far ships go from land, these birds fly around them.

Habits, Food, Reproduction, &c.—The habits of this species very much resemble those of the other Petrels. Mr. Selby remarks that most authors state that it lays but one egg, which M. Temminck describes as being pure white, nearly round, and of the shape of an owl's. Mr. Selby believes that a single egg is the general law, but he refers to Mr. Scarth's paper in the 'Linnean Transactions' (xiii.). The latter gentleman found a nest in passing over a track of peat-moss near the shore upon an uninhabited islet in Orkney. He was directed to it by the low purring noise of the female, and found *two* pure white eggs, of a very large size* as compared to the bird. Upon seizing the old one, she squirted out a very rancid oily substance. Upon taking her home, she was put into a cage, and various worms were offered to her, all of which she refused. At the end of four days, Mr. Scarth saw that she occasionally drew the feathers of her breast singly across or rather through her bill, and appeared to suck an oily substance from them. Upon this, he smeared her breast with train oil, and as she greedily sucked it, he repeated the smearing twice or thrice a day for a week. He then placed a saucer containing oil in the cage, in which she regularly dipped her breast, and then sucked her feathers as before. Thus he kept her alive for three months. Mr. Selby observes that some authors have stated that the young, as soon as hatched, are conducted to the water; but this he says is a mistake, as they remain in the holes till fully able to fly, which does not take place for some weeks, and during this time they are fed by the parents with oily matter ejected from their stomachs. 'Instances,' continues Mr. Selby, 'frequently occur of its being found rather far inland, either dead or in an exhausted and dying state; but the cause of such mortality has not hitherto been satisfactorily accounted for; it may however arise from weakness, occasioned either by old age or accidental illness, rendering it unable to contend with the autumnal and wintry blasts, during which period such instances are most frequent; and this is rendered more probable by its being commonly in an emaciated condition. The flight of the Storm-Petrel is remarkably swift, and is equalled by few of the feathered race. It is often seen darting from wave to wave, at intervals dipping its bill into the water as if in search of insects, or picking up food, during which it will stand as it were upon the summit of the billow with wings expanded and raised, but it is very rarely seen to alight for swimming, and is totally unable to dive, a faculty attributed to it in an eminent degree by some of the earlier writers.' In December, 1823, whilst sailing on the Thames, we saw one of these birds in the middle of the river, just below the Tower of London. It was disporting on the wing just above the surface of the water, which was very rough, and ever and anon settled on it, rising again almost immediately. It had blown a gale (which still continued when the bird was seen) for twenty-four hours. Many persons were in unsuccessful pursuit of it, they being apparently unacquainted with its habits, and taking it for a stray and wearied land-bird which was constantly dropping into the water.

M. Temminck (*Manuel*, 4th part) observes that M. Graba presumes that the moult of this species is double, and that in autumn their plumage has some obscure spots. M. Temminck further remarks that the variety found at Feroe differs from that found accidentally on his coasts in the want of the white on the scapulars and secondaries of the wings; in other respects there is no marked disparity. This is the *Hydrobates Feroensis* of Brehm, and is in all probability that alluded to by Brunnich, when he tells us that the inhabitants of the Feroe Isles make the bird serve as a candle, by drawing a wick through the mouth and rump, which, being lighted, is fed by the fat and oil of the body.

Thalassidroma Wilsonii.—Description.—Head and all the lower parts sooty black; back, scapulars, and wings black; some of the great wing-coverts bordered with whitish; all the upper tail-coverts, and, in some individuals, a part of the feathers of the thighs also or some of the lower coverts, pure white; tail nearly square, only slightly emarginate, the three lateral feathers white at their base; wings exceeding the tail more than an inch; bill and feet (tarsi 15 lines long) black; on the membranes a long yellow stain and the edges of the toes finely bordered with that colour; iris black; extremity of the nasal tube turned up. Total length of the bird 6 inches 3 or 4 lines. (*Both sexes in perfect plumage.*)

M. Temminck, who gives the above description, observes that the young birds doubtless differ but little from the adults; but they are not as yet exactly known. (*Manuel*, 4th part, 1840.)

This species appears to be the *Procellaria pelagica* of Wilson; *Procellaria oceanica* of Banks; *Procellaria Wilsonii* of the Prince of Musignano; *L'Oiseau Tempête* of Buffon, 'Enl.' 993; and *Pétrel échasse* of Temminck.

Localities.—The whole of America to Cape Horn; common on the coasts of Chili, the United States, and Brazil; more rare at the Cape of Good Hope than *Procellaria pelagica;* shows itself accidentally on the coasts of Spain and in the Mediterranean. (Temminck, *Manuel*, 4th part.)

Habits, Food, Reproduction, &c.—Nuttall, who enumerates their vulgar names of Stormy Petrels, Devil's Birds, and Mother Carey's Chickens with remonstrance, well describes their habits. 'On the edge of soundings, as the vessel' loses sight of the headlands, flocks of these dark, swift flying, and ominous birds begin to shoot around the vessel, and finally take their station in her foaming wake. In this situation, as humble dependents, they follow for their pittance of fare, constantly and keenly watching the agitated surge for floating mollusca, and are extremely gratified with any fat kind of animal matter thrown overboard, which they instantly discover, however small the morsel, or mountainous and foaming the raging wave on which it may happen to float. On making such discovery, they suddenly stop in their airy and swallow-like flight, and whirl instantly down to the waters. Sometimes nine or ten thus crowd together like a flock of chickens scrambling for the same morsel, at the same time pattering on the water with their feet, as if walking on the surface, they balance themselves with gently fluttering and outspread wings, and often dip down their heads to collect the sinking object in pursuit. On other occasions, as if seeking relief from their almost perpetual exercise of flight, they jerk and hop widely over the water, rebounding as their feet touch the surface with great agility and alertness. There is something cheerful and amusing in the sight of these little voyaging flocks, steadily following after the vessel, so light and unconcerned across the dreary ocean. During a gale it is truly interesting to witness their intrepidity and address. Unappalled by the storm that strikes terror into the breast of the mariner, they are seen coursing wildly and rapidly over the waves, descending their sides, then mounting with the breaking surge which threatens to burst over their heads, sweeping through the hollow waves as in a sheltered valley, and again mounting with the rising billow, they trip and jerk sportively and securely on the roughest sea, defying the horrors of the storm, and like magic beings seem to take delight in braving overwhelming dangers. At other times we see these aerial mariners playfully coursing from side to side in the wake of the ship, making excursions far and wide on every side, now in advance, then far behind, returning again to the vessel as if she were stationary, though moving at the most rapid rate. A little after dark they generally cease their arduous course, and take their interrupted rest upon the water, arriving in the wake of the vessel they had left, as I have observed, by about 9 or 10 o'clock of the following morning. In this way we were followed by the same flock of birds to the soundings of the Azores, and until we came in sight of the Isle of Flores.' (*Manual of the Ornithology of the United States and of Canada.*) Temminck states that their food consists of the seeds of some marine plants, small testaceans, mollusks, &c.; Wilson says that they feed on the gelatinous spora of the Gulf-weed (*Fucus natans*), as well as small fish, barnacles, &c. Nuttall informs us that these Petrels breed in great numbers on the rocky shores of the Bahama and the Bermuda islands, and along some parts of the coast of East Florida and Cuba. Mr. Audubon informed him that they also breed in large flocks on the mud and sand islands off Cape Sable in Nova Scotia, burrowing downwards from the surface to the depth of a foot or more. They also commonly employ the holes and cavities of rocks near the sea for this purpose. 'The eggs,' says Nuttall, in continuation, 'according to Mr. Audubon, are three, white and translucent. After the period of incubation they return to feed their young only during the night, with the oily food which they raise from their stomachs. At these times they are heard through most parts of the night, making a continued cluttering sound like frogs. In June and July, or about the time that they breed, they are still seen out at sea for scores of leagues from the land, the swiftness of their flight allowing them daily to make these vast excursions in quest of their ordinary prey; and hence, besides their suspicious appearance in braving storms, as if aided by the dark ruler of the air, they breed, according to the vulgar opinion of sailors, like no other honest bird, for taking no time for the purpose on land, they merely hatch their egg under their wings, as they sit on the water!'

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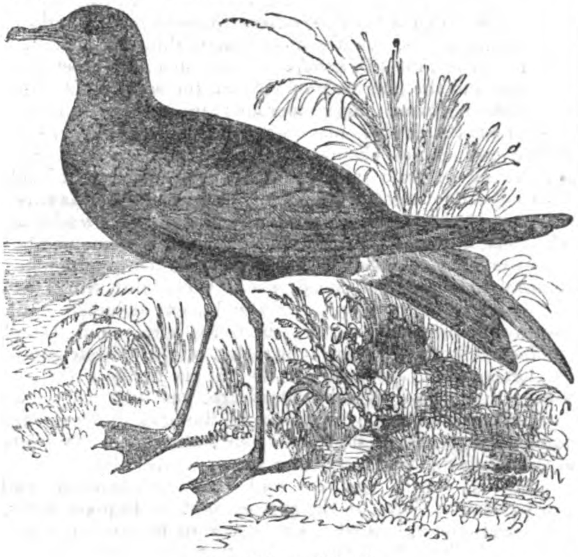
* About the size of a blackbird's.



Thalassidroma Wilsonii.

Fulmarus. (Leach.)

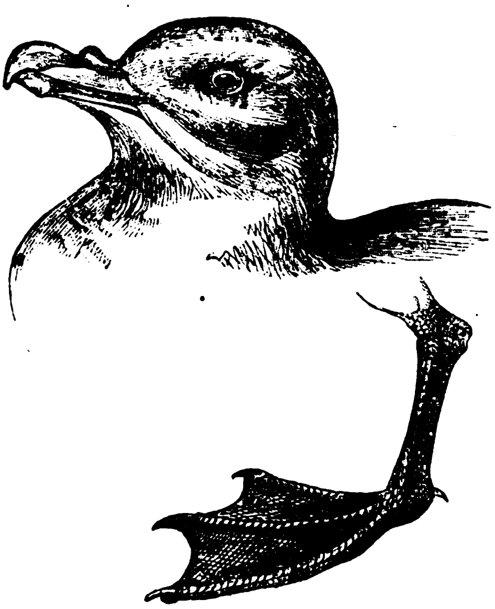
Mr. G. R. Gray gives *Wagellus*, Ray, as the generic name of this form, and Linnæus quotes *Wagellus Cornubiensium* as a synonym of the species which we are about to illustrate. But both Ray and Willughby (to say nothing of other parts of their descriptions) describe the bill of their bird as black, which appears not to be the colour of that of *Fulmarus glacialis*, either in the young or the adult state. Willughby's figure (t. 66), though not a good one, can hardly be taken for a Fulmar; the nostrils are not represented as tubular, nor the bill itself as large; and there is nothing to lead the observer to suppose that the figure was intended for that bird. Mr. Selby quotes the figure and description of Willughby as referrible to *Larus argentatus* of Brunnich.

Example, *Fulmarus glacialis*.

This species has been considered the type of the restricted genus *Procellaria*, Linn., by those who confine the subdivision of that genus to the genera *Procellaria*, *Puffinus*, and *Thalassidroma*. The bill of the *Fulmar* is stout, thick, with the upper mandible considerably hooked at the tip (where it is also dilated) and sulcated. The lower mandible is straight and slightly truncated. The nostrils are united in a single tube. The legs are moderate, and a sharp claw exists in the place of a hind toe.

Description.—Head, neck, all the lower parts, rump, and tail pure white; back, scapulars, wing-coverts and secondaries pure bluish-ash; quills bright grey brown; tail well rounded, conical; bill bright yellow tinged with orange on the nasal tube; iris and feet yellow. Length 16 inches. (*Both sexes, summer plumage.*)

Young of the Year.—The whole body bright grey clouded with brown; feathers of the wings and tail terminated by a deeper brown; the quills and caudal feathers have only a tinge of grey-brown; in front of the eyes an angular black spot; bill and feet yellowish ash. (Temminck.)

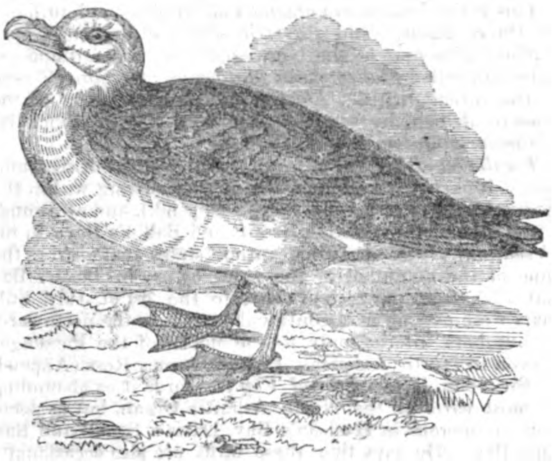


Head and foot of Fulmar.

This is the *Procellaria glacialis* of Linnæus and authors; *Le Pétrel Fulmar* and *Pétrel de l'île de Saint Kilda* of Buffon; *Hav-hest* of the Norwegians, by whom it appears to be also called *Mallemoke* or *Mullemuke; Gwylan y Graig* of the antient British; *Fulmar* and *Fulmar Petrel* of the modern British, by whom it is also named (provincially) *Mallemuck, Malmoke*, and *Mallduck*.

Localities.—The Polar regions principally during summer. It is noted by Major Sabine as occurring within the Arctic Circle (Parry's *First Voy.*, Append.), and as abundant at all times in Davis's Straits and Baffin's Bay: in his *Greenland Birds* the same author states that during the time of the detention of the ships by ice in Jacob's Bay (lat. 71°), from the 24th of June to the 3rd of July, Fulmars were passing in a continual stream to the northward, in numbers inferior only to the flocks of the Passenger Pigeon in North America. Captain James Ross (Append. to Sir John Ross's *Second Voy.*) records it as abounding in most parts of the North Atlantic Ocean, but as peculiarly numerous in Hudson's Bay, Davis's Strait, and Baffin's Bay. He says that these birds are also occasionally met with to the westward of Lancaster Sound, and in Regent's Inlet, following the whale ships, and availing themselves of the success of the fishermen, by feeding off the carcass of the whale after it has been deprived of its blubber and turned adrift. Temminck places the species always on the shelves and floating ice of the pole, and says that it is very accidental on the coasts of England and Holland; but that the seas of the Arctic Pole are covered with it at great distances from land. Mr. Selby (*Illustrations of Brit. Ornith.*) informs us that the steep and rocky St. Kilda, one of the western islands of Scotland, is the only locality within the British dominions annually resorted to by the *Fulmar*, the rest of the Scottish and our more southern coasts being rarely visited even by stragglers. Mr. Gould (*Birds of Europe*) observes, that although the Polar regions constitute its native locality, it is nevertheless found, but in much less abundance, in more temperate climates, such as the northern seas of Europe and America, extending itself throughout the lengthened coast of Norway, and not unfrequently Holland and France. It frequents also, he adds, the northern isles of Great Britain, resorting to the Orkneys and Hebrides for the purpose of breeding, but particularly to the island of St. Kilda.

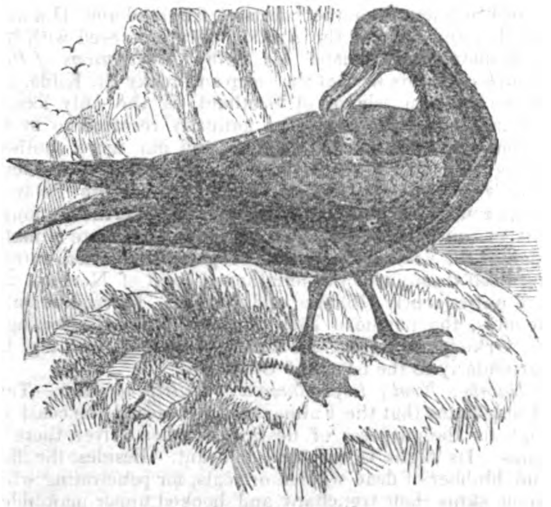
Habits; Food; Reproduction; Utility to Man.—Temminck states that the Fulmar never comes to the coast except for the purposes of nesting, or when driven there by gales. Its flight is easy and buoyant. Besides the flesh and blubber of dead whales or seals, for penetrating whose thick skins their trenchant and hooked upper mandible is admirably formed, barnacles and other parasites which attach themselves to the whales, mollusks, &c., form their food. Captain James Ross (*loc. cit.*) says that the bird is of essential service to those employed in the capture of the whale, by guiding them to those places where the whales are most numerous, and by giving notice of the first appearance of those animals at the surface of the water, by crowding to the spot from all quarters. The *Fulmar* also attends the fishing-vessels on the banks of Newfoundland, where it is called *John Down*, for the offal of the cod-fish, and is often taken with a hook baited with a piece of cod's liver or flesh. At St. Kilda they breed gregariously in the caverns and holes of the rocks; a single white large egg, with a very brittle shell, is deposited by the female, and the young, which are hatched about the middle of June, are fed with oily matter disgorged by the parents. As soon as they are fledged they are eagerly sought by the *cragsmen*, who scale the precipitous cliffs for them at the risk of their lives, for the sake of their down, feathers, and oil. 'No bird,' says Pennant, 'is of such use to the islanders as this; the Fulmar supplies them with oil for their lamps, down for their beds, a delicacy for their tables, a balm for their wounds, and a medicine for their distempers. The Fulmar is also a certain prognosticator of the change of wind; if it comes to land, no west wind is expected for some time; and the contrary when it returns and keeps the sea.' These birds are said to be salted for winter provision by the inhabitants of Baffin's and Hudson's Bay. Like the other Petrels, the Fulmars eject oil through their nostrils in self-defence, and it therefore becomes, as Mr. Selby observes, an essential point that they should be taken and killed by surprise, in order to prevent the loss of a liquid so valuable to those who capture them.



Fulmarus glacialis.

Procellaria. (Linn.)

The type of this genus, as restricted by Mr. G. R. Gray, is *Procellaria Æquinoctialis*, Linn.; *The Great Black Petrel* of Edwards.



Procellaria Æquinoctialis.

Mr. Darwin, in his valuable 'Journal and Remarks' (*Voy. of Adventure and Beagle*), remarks that the southern seas visited by the expedition are frequented by several species of Petrels. The largest kind, *Procellaria gigantea*, or Nelly (*Quebrantahuesos*, or *Break-bones*, of the Spaniards), is, he observes, a common bird, both in the inland channels and on the open sea. 'In its habits and manner of flight,' continues Mr. Darwin, 'there is a very close resemblance with the Albatross, and as with the latter bird a person may watch it for hours together without seeing on what it feeds, so it is with this petrel. The *Break-bones* is however a rapacious bird, for it was observed by some of the officers at Port S. Antonio chasing a diver. The bird tried to escape, both by diving and flying, but it was continually struck down, and at last killed by a blow on its head. At Port St. Julian also these great petrels were seen killing and devouring young gulls.' The same author adds that the Spaniards were probably aware of the rapacity of this petrel, for 'Quebrantahuesos' means properly an osprey. These large petrels are called *Mother Carey's Geese* by the sailors.

Diomedea. (Linn.) [ALBATROSS.]

Captain P. P. King, R.N., in his letter to Mr. Broderip above alluded to, says, 'Of the genus Diomedea the species which I regarded as the *D. spadicea, chlororhynchos*, and *fuliginosa* of authors, were the most remarkable. Near Tristan d'Acunha the first (*D. spadicea*) most abounded; between the Cape and the longitude of 30° east, the second (*D. chlororhynchos*) became more numerous; and in the neighbourhood of St. Paul's their place was supplied by *D. fuliginosa*. Where one species abounded, the others were only occasionally seen; from which it may be inferred that each species breeds in distinct haunts. Occasionally two or three varieties of the *D. exulans*, Linn., the *large wandering Albatross*, attended the ship, but they rarely remained beyond the day. *D. exulans* varies very much in plumage; generally however the head, neck, back, and wings are more or less mottled-grey, and the breast, abdomen, vent, and uropygium snowy white; the bill is horn-coloured, and the feet yellow. We saw a bird that might be referred to M. Lesson's *D. epomophora*, if that is really a distinct species. Another, of very large size, was near us for two days, which, with the exception of the back of the wings and tips of the under-side of the pen feathers and extremity of the tail being black, was of a snowy white colour.'

Drawings of *D. spadicea* and *D. chlororhynchos*, and descriptions of three of the species sent by Captain King, were read and exhibited. The descriptions agreed essentially with those from the same specimens in 'Wanderings in New South Wales,' by Mr. G. Bennett, who was a fellow-voyager with Captain King. The Report goes on to state that the reference of these to the species quoted is provisional only, as they differ in some important particulars from the original description of those species; it is therefore probable that they are rather to be viewed as indicating races hitherto unknown to zoologists. (*Zool. Proc.*, 1834.)

The author of the 'Wanderings' above noticed states that the known species are, *D. exulans, D. spadicea, D. chlororhynchus, D. fuliginosa;* and also, as enumerated by Cuvier, *D. brachyura* (Tem.), and *D. melanophris* (Tem.); to these two last Mr. Bennett had no opportunity of referring. He gives a description of a species found at Bass's Straits, among others, and has a chapter containing much interesting observation on the habits of the Albatrosses and the mode of capturing them. They appear to be unsparing in their voracity, for Mr. Bennett saw one which was shot dead instantly fallen upon by its companions, eager to make it their prey. The excretory duct of the nasal gland of the *Wandering Albatross* (*D. exulans*) was traced by Mr. Bennett for nearly two inches under the external plate of the upper mandible, in a direction towards the nostrils, but inclining slightly upwards, until he lost sight of it among the cellular substance of the bone.

Habits, Reproduction, &c.—Captain Carmichael (*Linn. Trans.*, vol. xii.) gives an account of the breeding of these birds, from personal observation, in the island of Tristan d'Acunha. As he and his party walked down the mountain on their return, they passed among flocks of Albatrosses engaged in the process of incubation or tending their young. Four species (*Diomedea spadicea, exulans, chlororhynchus*, and *fuliginosa*) breed on the island; none of them hatch more than one egg at a time. The two former give themselves no trouble, it appears, in constructing their nest, merely choosing a dry spot of ground, and giving it a slight concavity, to prevent the egg from rolling out of its place.

The egg is white, very large, uncommonly long in proportion to its diameter, and nearly of equal thickness at both ends. The black Albatrosses (*D. fuliginosa*) were gregarious when Captain Carmichael visited the island (January), and built their nests, which were constructed of mud, raised five or six inches and slightly depressed at top, close to each other. He counted upwards of a hundred in an area of half an acre. The birds stood motionless as statues on their respective hillocks till the party approached close to them, when they set up the strangest clattering with their beaks, and, on being touched, squirted a deluge of fetid oily fluid from the stomach on the offenders. The nest of *D. chlororhynchus* was solitary, and the bird selected some sheltered corner, particularly the small drains that draw the water off the land into the ravines. 'Here,' continues Captain Carmichael, 'it runs up its nest to the height of ten or twelve inches, of a cylindrical form, with a small ditch around the base. A curious circumstance with regard to this bird is, that when irritated, the feathers of its cheeks are separated, so as to display a beautiful stripe of naked orange skin running from the corners of the mouth towards the back of the head. All these birds nourish their young by disgorging the contents of their stomach. They are never observed to carry any article of food in their bill: those matters indeed from which they derive the chief part of their sustenance,—the blubber of dead whales, seals, and sea-lions,—would melt away if carried in the bill to any distance. We could not help admiring the utter unconsciousness of danger displayed by them on our approach; they never showed the least disposition to move out of the way; even when kicked, or pulled off their nests, they made not the smallest show of resistance; but quietly returned to their post, or stood until we passed on. Their plumage is of the finest order, copious, and without the slightest stain. They find great difficulty in getting on wing, and must run twenty or thirty yards along the ground with expanded wings, before they can get fairly under-way. We had the curiosity to take one of them by the point of the wings, and fling it over the rock; yet, though it had several hundred feet of a clear fall, it never recovered itself, but dropped down like a stone. On this account, when not engaged with their young, they usually rest upon the edge of the precipice, from which they can launch at once into the air.'

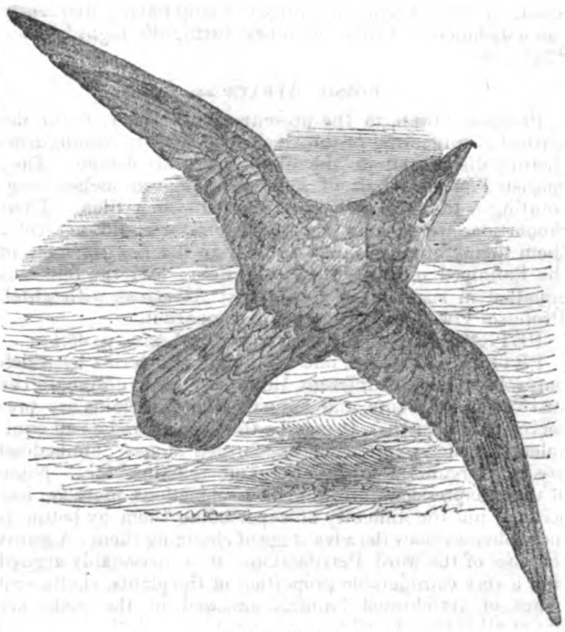
Captain Carmichael and his party, in a difficult part of their route, had to kick upwards of a dozen of them to the right and left before they could get on.

Prion. (Lacépède.)

This is the genus *Pachyptila* of Illiger.

Generic Character.—Bill strong, stout, wide, very much depressed, the upper mandible convex on its sides, terminated by a compressed hook; the edges furnished internally with cartilaginous lamellæ; the lower mandible very much depressed, formed of two arcs soldered at the point, and forming in their interval a guttural pouch; nostrils opening by two distinct orifices and disposed in the form of a short tube. A very small claw in place of a hind-toe. First *quill* longest.

The type of this genus is the *Blue Petrel* (*Procellaria vittata* and *cærulea*, Gm.) discovered by Forster. Many individuals were taken during the voyage of the *Coquille*, in 58° S. lat. The following is from M. Garnot's description of an individual of this species, which, in the form of its bill at least, appears to be leading the way towards the *Lamellibranchiate Palmipedes.* It is distinguished from the other Petrels by the disposition of its bill. The mandibles are hooked at their extremity; their base is very much widened. The edges of the upper mandible are directed a little outwards; they present within a projecting border striated transversely: the interval which separates them exhibits a small groove. The tongue is very thick and the mouth very dilatable. Total length, from the bill to the extremity of the tail, 11 inches (French). Length of the nasal tube 3 lines. Extent of wings 20 inches. Size a third larger than *Thalassidroma pelagica;* upper part of the body ashy blue or grey blue, deepest on the head and on the wings. A blackish band cuts across the wings and the lower part of the back near the origin of the tail. This portion is deepest in colour; the extremity of the tail has the same blackish deep blue tint; lower part of the body and wings white; above the tail a line of a blue tint; bill and eyes plumbeous blue; middle of the upper mandible and tube of the nostrils blackish. The middle tail-feathers are rather the longest, which gives the tail a rounded appearance. The same author gives an interesting detail of the anatomy of the bird.



Prion vittatus.

In a letter addressed by John Gould, Esq., corresponding member of the Zoological Society, dated Van Diemen's Land, May 10, 1839, and read on the 8th of October last, that distinguished ornithologist mentioned several interesting particulars relative to Oceanic birds observed by him upon his voyage. Immediately off the Land's End, Wilson's Storm Petrel (*Thalassidroma Wilsonii*) was seen in abundance, and continued to accompany the ship throughout the Bay. The little Storm Petrel (*Thalassidroma pelagica,* Selby) was also seen, but in far less numbers; both species disappeared on approaching the latitude of Madeira, their place there being occupied by another species, which Mr. Gould took to be *Thal. Bulweri.* This latitude was also favourable to the Shearwaters, *Puffinus cinereus* and *Puff. obscurus,* the former being there in great numbers. Mr. Gould crossed the equator on the 7th July, having been more than twenty days within the tropics, part of which time the vessel lay becalmed. This portion of the ocean's surface was also inhabited by Storm Petrels, but of a distinct species from any Mr. Gould had hitherto observed, and which he believes to be new to science. These birds, with now and then a solitary *Rhynchops* and Frigate Bird (*Tachypetes*), were all of the feathered race that he observed in these heated latitudes. On the 20th July, when the ship was in 26° S. lat., they were visited for the first time by the Cape Petrel (*Procellaria Capensis*): on the 23rd (lat. 31° 10′ S. long., 24° west) they were surrounded by the feathered race. Independently of an abundance of Cape Petrels, two other species and three kinds of Albatrosses were observed. The latter were *Diomedea exulans, D. Chlororhynchus,* and *D. fuliginosa.* A few days after this, they commenced running down their longitude, and from that time, until they reached the shores of Van Diemen's Land, several species of *Procellaridæ* accompanied the ship. Mr. Gould found, as he had every reason to expect, the Australian Seas inhabited by their own peculiar Storm Petrels (*Thalassidroma*), four distinct species of which he had already observed since leaving the Cape. 'From the westerly winds which prevail in the southern hemisphere,' adds Mr. Gould, 'between the latitudes 35° and 55°, I am induced to believe that a perpetual migration is carried on by several members of the oceanic family continually passing from west to east, and circumnavigating this portion of the globe. This remark more particularly refers to the Albatrosses, Prions, and other large kinds of Petrels; the same individuals of several of these species having been observed to follow our ship for some thousands of miles. Until I had ascertained that they were nocturnal, it was a matter of surprise to me how the birds which were seen around the vessel at nightfall were to be observed crossing our wake at day-break on the following morning, the ship having frequently run a distance of nearly 100 miles during the night.' (*Zool. Proc.*, 1839.)

Fossil Albatross.

Professor Owen, in the present month (May, 1840), described at a meeting of the Geological Society certain ornitholites discovered in the chalk near Maidstone. They consisted of the shaft of a humerus eleven inches long, wanting both ends, and two fragments of a tibia. Their proportions were such that the Professor could not refer them to any other group of birds than the *Longipennes* of the Palmiped order of Cuvier's system; and the humerus equalled in size that of the largest Albatross with which Professor Owen had been able to compare it.

PETRI'COLA. [Lithophagidæ, vol. xiv., p. 48.]

PETRIFACTIONS, one of the general terms by which naturalists have at different times sought to designate the vast variety of plants and animals whose remains are preserved in the earth. It may be thus considered as an equivalent for such expressions as 'formed stones,' 'imbedded fossils,' 'organised fossils,' 'organic remains,' &c. None of these expressions are free from objections more or less serious, but the difficulty of superseding them by better is more obvious than the advantage of changing them. Against the use of the word Petrifactions, it is reasonably argued that a very considerable proportion of the plants, shells, and bones of vertebrated animals enclosed in the rocks are not at all petrified; while, on the other hand, the process of lapidification has been found to have been perfectly performed on objects of comparatively recent date never imbedded in the earth, as the wood of a Roman aqueduct in Westphalia. Calcareous deposits from springs, which invest mosses, shells, and bones with a stony case, are often called petrifactions. [Organic Remains.]

PETROCINCLA. [Merulidæ, vol. xv., p. 122.]

Lieutenant-Colonel Sykes, in his 'Catalogue of Birds observed in the Dukhun' (Deccan), records a species under the name of *Petrocincla Pandoo*, and remarks that it differs from the *Solitary Thrush* of Europe (*Turdus Cyaneus*, Linn.) in its smaller size, slighter form, want of orange eyelids, and white tips to the feathers. *Pet. Pandoo* is found only in the dense woods of the Ghauts, and its flight is low and rapid. Colonel Sykes adds, that it appears to correspond with Var. A. of Dr. Latham's *Solitary Thrush*, vol. v., p. 47. *Petrocincla Maal* and *Petrocincla cinclorhyncha* are recorded by Colonel Sykes in the same catalogue. (*Zool. Proc.*, 1832.)

PETROICA. [Sylviadæ.]

PETRO'LEUM, a viscid variety of bitumen, which is found in many parts of Europe and America, but chiefly in Asia, flowing from beds associated with coal strata. As much as 400,000 hogsheads is said to be collected annually in the Birman empire. It is also abundant in Persia, and it is found, among other places, in the island of Barbadoes. It is sometimes used in medicine, and it is contained in the materia medica of the London Pharmacopœia, under the name of *Petroleum Barbudense*.

This substance has a dark reddish-brown colour; it is slightly translucent, and its odour is bituminous. The petroleum of Bechelbronn in the department of the *Bas Rhin* has been particularly examined by Boussingault: it is viscid, and has a very deep brown colour; it is known in the neighbourhood of the place in which it occurs by the name of *stone oil*, and is employed as a substitute for grease in diminishing the friction of machinery. It is totally and readily soluble in æther. When this petroleum is heated to the temperature of 212° in a retort, nothing whatever distils; it is evident therefore that it contains no naphtha. When however the heat is raised to nearly 450°, drops of an oily fluid come over, though very slowly; this oily body has a brown colour, and is very liquid; it is rendered pure by drying over chloride of calcium, and rectification. In obtaining this oil in the first instance the petroleum is mixed with water. *Petrolene* is the name given by Boussingault to this oil; its properties are, that it has a pale yellow colour, slight taste, and a bituminous smell. Its specific gravity is about 0·891. Even when cooled down to about 10° Fahr., it retains its fluidity. It stains paper like the volatile oils, boils at 536°, burns with a good deal of flame, but accompanied with much smoke. It is sparingly soluble in alcohol, but in larger quantity in æther. It yielded by analysis:—

Hydrogen	.	12·21
Carbon	.	87·04
		99·25

Dr. Thomson considers it to be constituted of

16 equivalents of hydrogen	= 16	.	12·5
20 equivalents of carbon	= 120	.	87·5
Equivalent	136		100·

Asphaltene is the solid portion of petroleum. Boussingault obtained it by treating petroleum with alcohol, which dissolves the greater part of the petroleum and leaves the asphaltene unacted upon; by the application of heat the whole of the more volatile constituent is expelled, and asphaltene, possessing the following properties, remains:—Its colour is black, and it has a great deal of lustre. It breaks with a conchoidal fracture, and is heavier than water. When heated to about 572°, it becomes soft and elastic. It burns, like the resins, without leaving any residue.

Dr. Thomson concludes, from the experiments of Boussingault, that asphaltene is composed of

15 equivalents of hydrogen	= 15	.	9·81
19 equivalents of carbon	= 114	.	74·51
3 equivalents of oxygen	= 24	.	15·68
Equivalent	153		100·

He is also of opinion that asphaltene is nothing more than petrolene combined with 3 equivalents of oxygen. It appears probable also that the petroleum of Bechelbronn is composed of

1 equivalent of petrolene	= 136	or	14·53
5 equivalents of asphaltene	= 765		85·47
Equivalent	901		100·

It is extremely probable that substances very differently constituted may be classed together under the general term of petroleum; for while Boussingault obtained a fluid carburetted hydrogen, which we have just described under the name of petrolene, from the petroleum of Bechelbronn, Drs. Christison and Reichenbach produced a solid carburetted hydrogen from the petroleum of Rangoon; the former called it *petroline*, and the latter *paraffin*. [Hydrogen, *Carburets of*.]

PETROMY'ZON, according to Linnæus, a genus of fishes, but now usually regarded as a family, called Petromyzidæ. These fishes constitute the section Cyclostomi of the 'Règne Animal,' and are distinguished by their imperfectly developed skeleton, their want of pectoral and ventral fins, combined with an eel-like form of body. The mouth is circular, consisting of a cartilaginous ring which supports the lips, this ring being formed by the soldering together of the palatine and mandibular bones. The branchiæ, instead of being pectinated, as in most other fishes, are purse-shaped; they are moreover fixed, and open externally by several apertures.

From the very imperfect state of their skeleton (which consists chiefly of a ribless series of cartilaginous rings), and some other peculiarities in their structure, these fishes may be regarded as the lowest of the vertebrate animals. The genus Petromyzon, as now restricted, contains the fishes commonly known as Lampreys. These eel-like fishes are of a cylindrical form, compressed towards the tail, and destitute of scales: they have seven branchial openings on each side, and a small opening connected with these on the upper surface of the head, situated nearly between the eyes the mouth, or maxillary ring, is armed with strong teeth, and on the inner disk there are smaller rasp-like tubercles: there are moreover two longitudinal series of small teeth on the tongue, which is so formed that, by its movement in the mouth, it acts as a piston, and enables the animal to attach itself by suction to any foreign body.

The Lamprey (*Petromyzon marinus*, Linn.) is usually about two feet in length, of a yellowish colour marbled with brown; its two dorsal fins are distinctly separated, the second one joins with the tail fin, as well as a small strip which represents the anal fin.

'The Lampreys, like the Sharks and Rays,' says Mr. Yarrell, 'have no swimming bladder; and being also without pectoral fins, are usually seen near the bottom. To save themselves from the constant muscular exertion which is necessary to prevent them from being carried along with the current of the water, they attach themselves by the mouth to stones or rocks, and were in consequence called

Petromyzon, or Stone-sucker; while the circular form of the mouth induced the name Cyclostomes, or round-mouthed fishes, which was bestowed upon them by M. Duméril.'

The Lamprey is highly esteemed for the table, and is consequently much sought after in the various rivers in which it is found. According to the author just mentioned, it is rather common during the spring and summer season in some of the rivers on the southern coast of England, particularly the Severn; and is found in smaller numbers in several of the rivers of Scotland and Ireland about the same period of the year. 'In Scotland,' Sir W. Jardine says, 'they ascend our rivers to breed about the end of June, and remain until the beginning of August. They are not furnished with any elongation of the jaw, afforded to most of our fresh-water fishes, to form the receiving furrows at this important season; but the want is supplied by their sucker-like mouth, by which they individually remove each stone. Their power is immense. Stones of very large size are transported, and a large furrow is soon formed. The *P. marinus* remains in pairs, two on each spawning-place; and while there employed, retain themselves affixed by the mouth to a large stone.'*

The Lamprey feeds upon soft animal substances, and often attacks fishes of large size; and fixing itself upon them, it eats the flesh by means of its rasp-like teeth.

Two other species of Lamprey, the *Petromyzon fluviatilis* and *P. planeri*, are found in England. The first, called the Lampern, or River Lamprey, is common in many of the English rivers. 'Formerly,' says the author of the 'History of British Fishes,' 'the Lampern was considered a fish of considerable importance. It was taken in great quantities in the Thames, from Battersea Reach to Taplow Mills, and was sold to the Dutch as bait for the turbot, cod, and other fisheries. Four hundred thousand have been sold in one season for this purpose, at the rate of forty shillings per thousand. From five pounds to eight pounds the thousand have been given; but a comparative scarcity of late years, and consequent increase of price, has obliged the line fishermen to adopt other substances for bait. Formerly the Thames alone supplied from one million to twelve hundred thousand lamperns annually. They are very tenacious of life, and the Dutch fishermen managed to keep them alive at sea for many weeks.'

This fish is usually about one foot in length, and coloured like the common eel: the lip surrounding the mouth has a continuous row of small points; there are two large teeth on the maxillary ring; and the dorsal fins, which are elongated, are distinctly separated. The third species, called the fringed-lipped lampern (*P. Planeri*), has the two dorsal fins placed close together; it is of a shorter and stouter form; and it may moreover be distinguished from the common lampern by its lips being furnished with numerous papillæ, forming a thickly-set fringe.

The fringed-lipped lampern appears to be usually smaller than the common species; it is found in the Tweed, and in some of the streams in the southern parts of Great Britain, but appears to be comparatively scarce.

The second genus of Petromyzidæ is the Mixine of Linnæus. In this genus the maxillary ring is altogether membranous, and only furnished with a single tooth on its upper part; the series of teeth on the tongue are strong, and arranged in two rows on each side, so that the jaws of these fishes appear to be lateral, like those of insects or the Nereides, a circumstance which induced Linnæus to place them in the class Vermes. The mouth is circular, and furnished with eight cirri; in its upper margin is a spiracle which communicates with its interior. The body is cylindrical, and furnished with a fin which surrounds the tail. The skeleton is here reduced to a mere cartilaginous tube. These singular fishes pour out such an abundance of mucus through the pores of their lateral line, that the water in the vases in which they are kept seems to be converted into a jelly. They attack and pierce other fishes like the lampreys. A certain Myxine found in the South Seas (Petromyzon cirrhatus of Forster), owing to its possessing seven branchial apertures like the lampreys, has furnished the type of Duméril's subgenus *Heptatremus*. In the subgenus *Gastrobranchus* (Block) the intervals of the branchiæ, instead of having separate openings, communicate with a common canal on each side, each of which terminates in a distinct hole situated under the heart. To this section belongs the Myxine, Glutinous Hag, or Borer of English authors, the *Mixine glutinosa* of Linnæus, and *Gastrobranchus cæcus* of modern authors. [Myxine.]

The next genus of this section (*Ammocetes*, of Duméril) has the same general form as the lampreys, and the branchial orifices are the same; but the mouth is semicircular, and the lip only covers the upper portion; hence the fishes have not the power of fixing themselves, like the true lampreys. They have no teeth, but the mouth is furnished with a series of fleshy tubercles.

The fish found in our streams, and known by the names Pride, Sandpride, and Mud Lamprey (*Ammocetes branchialis*, Cuv.), affords an example of this genus. This little fish, which is seldom more than six or seven inches in length, and about the thickness of a quill, lives chiefly in the mud at the bottom of fresh-water streams, and is said to be much preyed upon by eels.

The last division of this family is the genus *Amphioxus* of Yarrell, and this contains but one species, a most extraordinary little fish, which, it appears, was first described by Pallas, under the name of *Limax lanceolatus*, but had not been seen since his time till the subject of Mr. Yarrell's description was discovered by Mr. Couch on the shore near Polperro.

The *Amphioxus lanceolatus*, or *Lancelet*, is rather more than one inch in length, of a compressed form, and pointed at both extremities, but most so at the tail, and of a pale yellowish colour. 'The head is pointed,' says Mr. Yarrell, 'without any trace of eyes; the nose rather produced; the mouth on the under edge, in shape an elongated fissure, the sides of which are flexible; from the inner margin extend various slender filaments, regularly disposed, which cross and intermingle with those of the opposite side: along the sides of the body the muscles are arranged in regular order, diverging from a central line, one series passing obliquely upward and backward, the other series as obliquely downward and backward: the anal aperture is situated one-fourth the whole length of the fish in advance of the end of the tail; the tail itself is pointed: from the nose to the end of the tail a delicate membranous dorsal fin extends the whole length of the back, supported by very numerous and minute soft rays; the surface of the body is smooth. The body is supported internally throughout its length by a flexible cartilaginous column, from which the numerous muscles diverge.'

PETRO'NIUS A'RBITER is the name of the author, or supposed author, of a kind of novel in Latin, of which we have only fragments, descriptive of the licentious manners of the Romans under the empire. Several young debauchees, one of whom is the chief narrator, are represented strolling about Campania, and then proceeding by sea to Croton; they meet with numerous adventures with men and women of various ranks, but all as profligate as themselves. Both the descriptions and the dialogue are extremely obscene, and serve to corroborate the testimony of Juvenal and other writers as to the excessive depravity of morals under the empire. As a picture of manners, the work is not without its value, though it is totally unfit for general readers. The style is fluent and the language is considered classical. The episode entitled 'Trimalcion's Feast' is a curious description of a banquet given by a pompous wealthy freedman. The narrative is intermixed with verses and fragments of poems, one of which refers to the civil wars of Cæsar, and contains a very strong invective against the corruption of Roman manners. The prose narrative has been supposed by some to be a satire on Nero and his court, but this supposition does not seem to rest on sufficient evidence. Indeed the age of the work is not ascertained, and some date it as late as the time of the Antonines. (Ignarra, *De Palæstra Neapolitana.*) Caius Petronius, a man of high rank, is mentioned by Tacitus (*Annal.*, xvi. 18, 19) as being for a time a favourite of Nero, and minister of his pleasures, 'arbiter elegantiæ,' which may be translated umpire of fashion and master of the ceremonies. Being afterwards discarded by Nero through the jealousy of Tigellinus, and expecting his sentence of death, he anticipated it by causing his veins to be opened in the bath, and allowing himself to die gradually while conversing with his friends on light subjects. He is stated during this interval to have written an account of Nero's secret debaucheries, which he sent to the emperor. Whether the fragment which we have was part of this work, or whether it was written by another Petronius, has been much disputed. The best edition of

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* 'History of British Fishes,' vol. ii.

Petronius is that by P. Burmann, 2 vols. 4to. 1743, in which all the various opinions on the work and its author are given.

PETRO'PHILA. [Merulidæ, vol. xv., p. 122.]

PETRO'SILEX. This name has probably been given to two different minerals, viz. compact quartz and compact felspar; the latter has also been termed fusible petrosilex. [Felspar.]

PETROSELI'NUM. [Parsley.]

PETROV, VASSILI PETROVITCH, was the son of a clergyman at Moscow, where he was born in 1736. While in the Zaikonospasskoi school in that city, he distinguished himself by his aptitude for antient and modern languages, and also by a natural eloquence, and fluency of ideas and words. Whether he exhibited much precocity of talent in poetry is less certain, for it was not until his twenty-seventh year that he composed the ode on Catherine's coronation, which obtained for him the notice and protection of the empress herself, and of many of the nobles at her court, and especially of Prince Potemkin. For a time he held the appointment of reader to the empress, but at his pressing solicitations obtained leave to travel. He visited England and several other countries, from the year 1772 to 1774. After his return he was made imperial librarian, which situation however he was obliged to give up in 1780, on account of ill health, and he retired with a pension to a village in the government of Orlov. Here he divided his time between literary and agricultural pursuits, visiting Moscow every winter for the purpose of availing himself of its libraries. So diligent were his habits of study, that at the age of sixty he began to learn the modern Greek language. He died December 4-16, 1799, in his 64th year.

A complete edition of his original works appeared in 3 vols. 8vo., 1811; besides which there is a translation by him of Virgil's 'Æneid,' in 2 vols., 1781-6. His poems consist chiefly of odes and epistles, and although they have now lost much of their first interest, having been written upon particular occasions, many of the former are stamped by high poetical beauty and merit, by vigour and originality of ideas, and by energy of expression; but it must at the same time be admitted that his versification is occasionally harsh, and his diction not sufficiently polished. It should be borne in mind however, that at the time Petrov began to write, the language itself had not received that refinement which it now possesses, and he certainly did much for his native literature. Merzliakov calls him the 'philosopher bard,' and says that he 'abounds in transcendent imagery, traced with a pen of fire.'

PETRUS DE ABA'NO. [Abano.]

PETRUS HISPA'NUS, a native of Lisbon, son of a physician named Julian, became eminent for his acquaintance with the sciences, particularly that of medicine, the practice of which he followed for some time with great reputation. He afterwards entered holy orders, and advanced by degrees to high preferment. After being archbishop of Braga in Portugal (*Bracara Augusta*), he was made cardinal by Gregory X., A.D. 1273; and on the death of Adrian V. he was elected to the pontifical dignity, Sept. 13, 1276. He took the name of John, and styled himself on his seal Joannes XX.; but in his epitaph at Viterbo he is called Joannes XXI.[*] One of the first acts of his pontificate was to confirm Adrian's revocation of the famous constitution of Gregory X. (enacted at the council of Lyon, 1274), which ordered that the cardinals should be strictly shut up in the conclave during their election of a new pope. He did all in his power to assist the Christians in the East, and sent legates to the different princes of Europe to persuade them to engage in a fresh crusade against the Saracens. He died at Viterbo, about eight months after his elevation to the holy see, May 17, 1277, of the injuries occasioned by the falling of the roof of his bed-chamber. He was a very learned man himself, and a great patron of learning in others; but he does not seem to have been eminent for piety and holiness of life. He wrote several works on medicine, logic, &c., of which the greater part are still unpublished. A list of their titles may be seen in Ciaconius, 'Vitæ Pontiff. et Cardd.,' tom. ii., p. 213. The most celebrated is a short medical treatise entitled 'Thesaurus Pauperum, seu de Medendis Corporis Humani Morbis per Euporista,' of which there are several editions. It was first printed 1476, Antwerp, fol.; the last edition was published 1577, Paris, 16mo., with a sort of continuation by J. Liebault, entitled 'Thesaurus Sanitatis, Paratu facilis.' A Spanish translation was published at Valladolid, 1672; and an English one by Humphrey Lloyd, London, 1585, 8vo. It consists of 90 chapters, containing a short account of a great number of diseases, and at the end of each is given a quantity of medical formulæ taken from the works of the Greek, Latin, and Arabic physicians, to which is now and then added the word *expertum*. It is not of much value, and contains a great deal that is foolish and superstitious. In the collected edition of the works of Isaac (commonly called 'Isaac Israelita'), Lugd., 1515, fol., there are three treatises by Petrus Hispanus: one entitled 'Commentarium singulare super Librum Dietarum Universalium Isaac, fol. xi.-ciii.; the second a commentary on Isaac's work 'De Diætis Particularibus,' fol. ciii.-clvi.; and the third on his work 'De Urinis,' fol. clvi.-cciii. There is a tract by J. T. Köhler, which the writer of this article has not been able to consult, entitled 'Vollständige Nachricht von Pabst Johann XXI., welcher unter dem Namen Petrus Hispanus als ein Arzt und Weltweiser berühmt ist,' Götting., 1760, 4to. (Ciacon., *Vitæ Pontiff. et Cardd.*; Haller, *Biblioth. Medic. Pract.*)

PETTY, SIR WILLIAM, an eminent political economist, was born May 16th, 1623, at Romsey in Hampshire, where his father carried on the business of a clothier. After remaining until the age of fifteen at the grammar-school of his native place, he went to pursue his studies at Caen in Normandy. On his return, he is said to have entered the navy, but the time which he spent in this service must have been short, as in 1643 he again visited the Continent, and spent three years in France and the Low Countries. During this interval he studied medicine and anatomy. In 1648 he published a small work, addressed to Mr. Samuel Hartlib, recommending the extension of education to objects connected more immediately with the daily business of life. Soon afterwards he went to Oxford, where the visitors appointed by the parliament had ejected the royalists, and employed himself in giving instruction in anatomy and chemistry; in 1649 he was created doctor of physic, and elected a fellow of Brazen-nose College. In 1650 he was appointed to the anatomical professorship in the university. He was an active member of a society instituted in Oxford for the cultivation of natural science, and which was the immediate precursor of the Royal Society. When the Royal Society was established, he was one of the council. In 1652 the period of his good fortune commenced by his appointment as physician to the army in Ireland. In 1654 he was employed in that country in the survey of forfeited estates, a work which he performed with great ability. He was subsequently engaged as a commissioner in dividing these lands amongst the officers and soldiers of Cromwell's army, when, besides the land allotted to him, he made advantageous purchases. He also acted as secretary to Henry Cromwell, lord-lieutenant of Ireland. He appears however to have been well received by Charles II. at the Restoration, and in 1661 was knighted. Sir William Petty died at his house in Westminster, December 16th, 1687, and was buried in the church of his native town, where a plain stone marks his grave, with the simple inscription—'Here lyes Sir William Petty.' His last will contains the following profession of his religious opinions:—'I die in the profession of that faith and in the practice of such worship as I find established by the laws of my country; not being able to believe what I myself please, nor to worship God better than by doing as I would be done unto, and observing the laws of my country, and expressing my love and honour of Almighty God by such signs and tokens as are understood to be such by the people with whom I live, God knowing my heart even without any at all.' The widow of Sir William Petty was created Baroness Shelburne. He left two sons and a daughter. The eldest son succeeded to the title, but dying without issue, it was revived in Henry, the second son, great-uncle of the first marquis of Lansdowne.

Sir William Petty was the author of several scientific works and inventions, and various papers on mathematical and chemical subjects in the 'Philosophical Transactions;' but he is far better known in the present day as a writer upon trade and commerce and political arithmetic. Notwithstanding the great variety of his pursuits, he had emancipated himself from nearly all the errors and prejudices of

[*] The confusion about the popes of the name of John is partly occasioned by the fictitious Pope Joan being reckoned as John VIII. This however will not entirely account for it, as Petrus Hispanus is sometimes called John XIX., and sometimes John XXII. (See Genebrard, *Chronograph.*, lib. iv., Paris, 1580, fol.)

his contemporaries. The 'Political Anatomy of Ireland,' one of his best works, contains valuable information respecting the state of Ireland in the latter part of the seventeenth century, and gives the first authentic account of the population. Sir William Petty clearly foresaw the advantages of a union of Great Britain and Ireland, and of a free commercial intercourse between the two countries. The survey of Ireland which he made during the Protectorate continues, after the lapse of nearly two centuries, to be a work of reference in courts of law in matters relating to landed property. His treatise on 'Taxes and Contributions,' published in 1667, contains in general sound views on the subjects of finance and revenue; and in this work the doctrine was first clearly stated, though only in an incidental manner, that the labour required for the production of commodities alone determines their value. The 'Political Arithmetic' treats chiefly on the subject of population, particularly with reference to London. His predictions concerning the growth of the metropolis are amusing, and do not exhibit his usual acuteness. At the time when he wrote, he calculated that the population of London doubled itself in 40 years, and that of England in 360 years; and hence he concluded that the population must reach a stationary point before 1840, at which period it would be ten millions for the metropolis, and also ten millions for the rest of England. 'Wherefore (he remarks) it is certain and necessary that the growth of the city must stop before the said year 1840.' Since 1700 however London has increased 122 per cent., and England 154 per cent. Sir William Petty published his 'Quantulumcunque' (a treatise on money) in 1682, at which period the question of the monetary circulation was of great interest. He recommended that one metal should be made the uniform measure of value, in which view he was supported by Locke: Sir Isaac Newton proposed both the precious metals. The subject is treated with great ability, but the error of his time is perceptible in some of his arguments, which show that he entertained the false notion that there was something about gold and silver distinguishing them as articles of commerce from all other commodities. In this work he condemned laws regulating the rate of interest, observing that there might as well be laws to regulate the rate of exchange; and he exposed the prevailing fallacy that a country may be drained of cash by an unfavourable balance of trade. A list of the remainder of Sir William Petty's works is given in Watt's 'Bibliotheca Britannica.'

PETUNTZE, the Chinese name for a white earth used with kaolin in the manufacture of porcelain: it is stated that while the former [KAOLIN] is derived from the decomposition of the felspar of granitic rocks, the latter, or petuntze, is the same mineral which has not suffered decomposition, and that on account of its fusibility it is employed in glazing the porcelain.

PETWORTH. [SUSSEX.]

PEUCE'DANIN, a peculiar principle obtained from the *peucedanum officinale*, or sea sulphur-wort. By treatment with alcohol a solution was obtained which deposited crystals, to which the name of *peucedanin* was given by Schlatter. These crystals are colourless, acicular, transparent, inodorous, and insipid; but when dissolved in alcohol, their taste is very aromatic; they melt at 140° without losing weight; and when the heat is increased, the fluid mass assumes a greenish and afterwards a greyish-white tint: they are insoluble in cold water, and melt in it when boiling without dissolving; in cold alcohol they dissolve but sparingly, but when it is heated to 140°, they dissolve in it readily, and the solution is decomposed by water, and also by solution of chloride of tin, sulphate of copper, and acetate of lead, but not by sulphate of iron. It does not appear to possess either acid or alkaline properties. It yielded by analysis:—

2 equivalents of hydrogen	2	or	5·8
4 equivalents of carbon	24		70·6
1 equivalent of oxygen	8		23·6
Equivalents	34		100·

PEUTINGERIAN TABLE is the name given to a map of the roads of the antient Roman world, which is on parchment, and was found in a library at Speyer in the fifteenth century. It was bequeathed by the proprietor Conrad Celtes to his friend Conrad Peutinger, a learned man of Augsburg, who began to prepare a copy of it for publication, but died in 1547, before he could effect his purpose. Mark Velter however copied it on a scale less than one-half of its original size, and sent his copy to Ortelius, who forwarded it to Muretus, who published it in 1598. This reduced copy has been inserted in the Ptolemy of Bertius, in Horn's 'Orbis Delineatio,' and in Bergier's 'Histoire des grands Chemins de l'Empire Romain.' The original map remained at Augsburg, in the possession of Peutinger's descendants, till 1714, when it was purchased by a bookseller, and sold by him to Prince Eugene, who gave it to the imperial library of Vienna. An exact copy of it was made by F. C. von Scheyb, at Vienna, with an introduction and index, and dedicated to the empress Maria Theresa; 'Tabula Itineraria Peutingeriana, quæ in Augusta Bibliotheca Vindobonensi nunc servatur, adcurate exscripta à Fr. Christoph. De Scheyb, cum Indice,' fol., Vienna, 1753. The map is 21 feet in length, and about one foot wide. The author, whoever he was, did not intend to draw a proper geographical map, with the relative position of countries [MAP; AGATHODÆMON], but merely to collect all the great roads of the empire into a long narrow strip, marking the stations upon each, and the distances between the stations, for the information of travellers and chiefly of military and civil officers. In consequence of this arrangement, the great lines of roads are represented as nearly parallel, and most of the great rivers are also made to run in the same direction, from west to east or east to west, which was that of the greatest length of the Roman empire. But the northern and southern boundaries of the empire are brought into close approximation to each other, without any regard to the latitude. For the same reason, the Mediterranean, Adriatic, Ægean, and Euxine seas are all compressed in breadth into the shape of long channels, the peninsula of Italy appears to run straight from west to east, and the islands, such as Sicily, have undergone a like compression of form. The towns on the roads are marked by small houses; some, being worthy of particular notice, are designated by square buildings like barracks; and some more important towns and military stations, such as Aquileia, Ravenna, &c., are distinguished by walls and towers. Rome is distinguished by a circle with a crowned figure seated in the middle, and the port of Trajan is conspicuously sketched near the right bank of the Tiber, at the mouth of the river. Constantinople is marked by a circle and a figure, which however is not crowned. Antioch is the only other city which is also distinguished by a circle and a figure, in which last Mannert thinks that he recognises the Virgin Mary, which he believes to be an interpolation of some copyist of the middle ages, who had before him an older map of the time of the Pagan emperors. (Mannert's 'Introduction' to his new edition of Peutinger's Table, folio, Leipzig, 1824.) That the original map was drawn while the old religion of the empire was still dominant, seems proved by the heathen temples which are marked upon it, whilst there is no Christian name, with the exception of St. Peter's at Rome, which is probably also an interpolation of the copyist, who has taken care to notice the desert between the Red Sea and Palestine, as being that 'in which the children of Israel wandered for forty years,' as well as Mount Sinai, where 'they received the law.' Several other particulars on the map seem to fix the date of its original construction to about the time of Alexander Severus, after the Persians had overthrown the Parthian dominion, A.D. 226. The Persian empire is marked in its full extent and written in large capitals, whilst Parthia is indicated by smaller characters as a province. Palmyra is marked as an important place, with roads leading to it through the desert, which would seem to refer to an epoch previous to its destruction by Aurelian. Edessa in Macedonia is marked under that name, whilst in the Antonine Itinerary it is called Diocletianopolis. This and other evidence collected by Mannert indicate at all events an epoch between the reign of Alexander Severus and the end of the third century, making allowance for the interpolations of subsequent copyists.

The Peutingerian Table does not always agree with the Antonine Itinerary; several stations and towns which are in the one are not in the other; the distances between the stations marked on both sometimes disagree; besides which, in consequence of the form of the map, several roads which are distinct on the Itinerary are placed on the map consecutively, as if they all formed one line; whilst others, which are single roads on the Itinerary, are cut into two or three in the map. However the Itinerary is still of great use in explaining the map, and the two together are among the most valuable antient works on geography which have come down to us.

The map extends to the right, or east, as far as the mouths of the Ganges. Roads are traced through India to several emporia, or places of trade, on the coast. To the west the map ends abruptly on the borders of Spain, including farther north only the eastern part of Britain. It is evident, as Mannert maintains, that one leaf is wanting, and it has perhaps been lost.

PEW. A pew is defined by Dr. Johnson to be 'a seat enclosed in a church.' Sittings enclosed in a church would perhaps be a more correct description, inasmuch as a pew contains several seats; and it not unfrequently happens that different families have the right of sitting in the same pew. The word pew is scarcely to be met with in authors upon ecclesiastical law, who almost invariably use the expression 'church seat.'

There were no pews in churches until about the period of the Reformation, prior to which the seats were moveable, such as chairs and benches, as we see at this time in the Roman Catholic churches on the Continent. Before that time no cases are to be found of claims to pews, although in the common-law books two or three claims are mentioned to seats in a church or particular parts of a seat, which were probably moveable benches or forms.

'By the general law and of common right,' Sir John Nicholl observed (in Fuller *v.* Lane, 2 *Add. Eccl. Rep.*, 425), 'all the pews in a parish church are the common property of the parish; they are for the use *in common* of the parishioners, who are all entitled to be seated orderly and conveniently so as best to provide for the accommodation of all.' The right of appointing what persons shall sit in each seat belongs to the ordinary (3 *Inst.*, 202); and the churchwardens, who are the officers of the ordinary, are to place the parishioners according to their rank and station; but they are subject to his control if any complaint should be made against them.' (Pettman *v.* Bridger, 1 *Phill.*, 323.) A parishioner has a right to a seat in the church without any payment for it, and if he has cause of complaint in this respect against the churchwardens, he may cite them in the ecclesiastical court to show cause why they have not seated him properly; and if there be persons occupying pews who are not inhabitants in the parish, they ought to be displaced in order to make room for him. This general right however of the churchwardens as the officers of the ordinary is subject to certain exceptions, for private rights to pews may be sustained upon the ground of a faculty, or of prescription, which presumes a faculty.

The right by faculty arises where the ordinary or his predecessor has granted a licence or faculty appropriating certain pews to individuals. Faculties have varied in their form; sometimes the appropriation has been to a person and his family 'so long as they continue inhabitants of a certain house in the parish:' the more modern form is to a man and his family 'so long as they continue inhabitants of the parish' generally. The first of these is perhaps the least exceptionable form. (Sir J. Nicholl, 2 *Add.*, 426.)

Where a faculty exists, the ordinary has parted with his right, and therefore cannot again interfere: it has however been laid down in the ecclesiastical court that where a party claiming by faculty ceases to be a parishioner, his right is determined. Sir John Nicholl states, 'Whenever the occupant of a pew in the *body* of the church ceases to be a parishioner, his right to the pew, howsoever founded, and how valid soever during his continuance in the parish, at once ceases.' (Fuller *v.* Lane, 2 *Add.*, 427.) The same doctrine has been sanctioned by the Court of King's Bench. (Byerley *v.* Windus, 5 *Barn. and Cress.*, 18.) But in a case in the Court of Exchequer, chief-baron Macdonald was of a different opinion. The question there was whether there could be in law a prescription for a person living out of the parish to have a pew in the *body* of the church, and it was held that there might (Lousley *v.* Hayward, 1 *Y. and I.*, 583). As prescription presumes a faculty, these opinions seem to be at variance. Where a claim to a pew is made by prescription as annexed to a house, the question must be tried at law. The courts of common law in such cases exercise jurisdiction on the ground of the pew being an easement to the house (Mainwaring *v.* Giles, 5 *Barn. and Ald.*, 361); and if the ecclesiastical courts proceed to try such prescription, a prohibition would issue. In order to support a claim by prescription, *occupancy* must be proved, and also *repair* of the pew by the party, if any has been required; the onus and beneficium going together. (Pettman *v.* Bridger, 1 *Phill.*, 325; Rogers *v.* Brooks, 1 *T. R.*, 431; Griffith *v.* Matthews, 5 *T. R.*, 297.) The above observations apply to pews in the *body* of the church. With respect to seats in the chancel, it is stated in the Report of the Ecclesiastical Commission, page 49, 'the law has not been settled with equal certainty, and great inconvenience has been experienced from the doubts continued to be entertained. Some are of opinion that the churchwardens have no authority over pews in the chancel. Again, it has been said that the rector, whether spiritual or lay, has in the first instance at least a right to dispose of the seats; claims have also been set up on behalf of the vicar; the extent of the ordinary's authority to remedy any undue arrangement with regard to such pews has been questioned.' (Gibson, 226; 3 *Inst.*, 202; 1 Brown and Goul., *Rep.*, 4; Griffith *v.* Matthews, 5 *T. R.*, 298; Clifford *v.* Wicks, 1 *B. and Ad.*, 498; Morgan *v.* Curtis, 3 *Man. and Ryl.*, 389; Rich *v.* Bushnell, 4 Hagg., *Ecc. Rep.*, 164.)

With regard to aisles or isles (wings) in a church, different considerations apply. The whole isle or particular seats in it may be claimed as appurtenant to an antient mansion or dwelling-house, for the use of the occupiers of which the aisle is presumed to have been originally built. In order to complete this exclusive right it is necessary that it should have existed immemorially, and that the owners of the mansion in respect of which it is claimed should from time to time have borne the expense of repairing that which they claim as having been set up by their predecessors. (3 *Inst.*, 202.)

The purchasing or renting of pews in churches is contrary to the general ecclesiastical law. (Walter *v.* Gunner and Drury, 1 Hagg., *Consist. Rep.*, 314, and the cases referred to in the note, p. 318; Hawkins and Coleman *v.* Compeigne, 3 *Phill.*, 16.)

Pew-rents, under the church-building acts, are exceptions to the general law; and where rents are taken in populous places, they are sanctioned by special acts of parliament. Pew-rents in private unconsecrated chapels do not fall under the same principle, such chapels being private property.

PEWTER, a compound metal extensively employed, especially in the manufacture of those drinking-vessels called *pewter pots.* The finest pewter is said to consist of 12 parts of tin, 1 part of antimony, and a very little copper; while common pewter consists of about 80 parts of tin and 20 of lead. Pewter was formerly much more employed than at present, especially in the manufacture of plates and dishes.

PEYER, JEAN CONRAD, was born at Schaffhausen in 1653. He studied medicine at Basle and at Paris, and having taken the degree of doctor of medicine at the former university, returned to practise at his native town. He held there successively the professorships of eloquence, of logic, and of the physical sciences; but his present reputation is derived chiefly from his having first clearly described the little bodies which are scattered in patches along the end of the small intestines, and which are therefore commonly called Peyer's glands. He died in 1712. Besides his work on the intestinal glands, Peyer wrote numerous detached papers on morbid anatomy, of which he was one of the most assiduous of the early cultivators, and a few on practical medicine and comparative anatomy.

PE'ZE'NAS, a town in France, in the department of Hérault, on a cross-road from Aix to Perpignan, 39 miles from Montpellier, the capital of the department. Pézénas was known to the Romans by the name Piscenae; and is mentioned by Pliny (*Hist. Nat.*, lib. viii., c. 48) as producing in the neighbourhood wool which resembled hair rather than wool. In the middle ages it was the capital of a county. The town is pleasantly situated on the Peyne, a little stream which falls into the Hérault on its right bank, just below Pézénas. It has some tolerably good houses, and a handsome theatre. The population in 1831 was 7481 for the town, or 7847 for the whole commune. The townsmen manufacture blankets and coverlets, serges and other woollen stuffs, linens, cotton-yarn, thrown silk, hats, brandy, distilled waters, syrup of sugar and grapes, and chemical products. There are some dye-houses and tan-yards. Considerable trade is carried on in wines (of which the neighbourhood produces some of excellent quality), wheat, oats, seeds, red tartar, dyeing herbs, dried fruits, capers, olives, oil, cotton, wool, and woollen cloths. There is a considerable weekly market, and there are three yearly fairs. The neighbouring hills are covered with vines and almond and olive trees, and there is near the town an old castle built by the Constable Montmorency [MONTMORENCY], to whose family the county of Pézénas at one time belonged. There are a high school, a subordinate court of justice, and an Exchange.

PEZO'PORUS. [PSITTACIDÆ.]

PFEFFEL, GOTTLIEB CONRAD, a German writer of classic reputation in that branch of literature which comprises the tale, the fable, and the epistle, was born June 28th, 1736, at Colmar, where his father held an appointment in the office for foreign affairs. His parent dying in 1738, Pfeffel was left entirely to the charge of an excellent mother. At the age of fifteen he was sent to the university of Halle for the purpose of applying himself to the study of jurisprudence; but this plan was entirely frustrated by a severe attack of ophthalmia, which terminated in his total blindness at the age of twenty-one. He married about two years after this misfortune, and at a later period (1773) obtained permission to establish at Colmar a seminary for the education of Protestant youths, in conducting which he had an able colleague in his friend Hofrath Lerse. Among his pupils, who were chiefly the sons of Swiss families, were many who afterwards distinguished themselves. The changes produced by the French revolution however caused this school, which bore the title of a military one, to be broken up, and Pfeffel henceforth applied himself entirely to those literary occupations which, notwithstanding his blindness, he had before pursued at intervals. In 1803 he was made president of the Evangelical Consistory at Colmar, then recently established. He died May 1st, 1809, just after the publication of the ninth volume of his 'Poetischen Versuche.'

His poems generally display shrewdness and humour, together with a strong vein of moral and religious feeling; but his peculiar power shows itself most in his fables, which have frequently an epigrammatic energy and a piquant turn of expression that render the moral couched in them additionally striking and effective. Besides these and his tales, his other productions consist chiefly of poetical epistles, epigrams, ballads, and lyrical pieces. In addition to these original compositions, he translated a great many dramatic pieces from the French, which he published in five separate volumes or collections, from 1765 to 1774. These were indeed rather free versions than literal translations of the originals; for he did not scruple to retrench on the one hand what he considered their prolixities, and on the other to expand those parts of the dialogue which furnished hints for the purpose. His own dramatic attempts were less successful, since notwithstanding the skill shown in the arrangement of their plan, and the merit of many of their detached scenes, they were deficient in sustained interest and effect.

PFORZHEIM, the most important manufacturing town in the grand-duchy of Baden, is situated in 48° 55′ N. lat. and 8° 48′ E. long., in the circle of the Middle Rhine, at the entrance of the Black Forest, and on the navigable river Ens, near its junction with the Nagold and Wurm. It is surrounded with a wall and moat, and consists of the town and three suburbs. There are four churches and an antient palace, the church of which contains a handsome monument to the late Duke Charles Frederick. Among the public institutions are a convent for noble ladies, an hospital, an infirmary, an orphan-house, an asylum for the deaf and dumb, &c. The population of the town and suburbs is above 6500. The manufacture of trinkets employs above 1000 workmen; the value of the articles manufactured by them (in which no gold under 14 carats must be used) is 100,000*l.* sterling per annum. The manufactures of watches, superfine cloth and kerseymere, leather, hardware, and iron-wire are flourishing. There are also an iron-foundry, which furnishes annually 5000 cwt. of bar-iron, a copper-foundry, a manufactory of chemicals, many establishments for dyeing Turkish-red, and extensive bleaching-grounds. Pforzheim has a very great trade in timber from the neighbouring forests of Hagenschiess, which is floated down the Neckar and the Rhine to Holland. The trade in corn, oil, wine, and cattle is not inconsiderable, for which the situation of the town, on the high road from France to the south of Germany, is very favourable. The inhabitants have been always distinguished for their bravery and devoted attachment to their princes. Four hundred citizens, commanded by their burgomaster Deimling, formed the body-guard of the brave margrave George Frederick, in the battle of Wimpfen, May 6, 1622, in which, with 20,000 men, he engaged the far superior Imperial army commanded by Tilly. Victory already inclined to his side, when the powder-waggons were blown up, and scattered destruction among his troops. Flight was the only resource, which the Margrave, at the earnest entreaty of his followers, resolved to adopt. But even flight could not have saved them, if those 400 brave men had not arrested the advance of the enemy, till the Margrave and all the rest of the army were in safety, by sacrificing their lives to the last man.

(G. L. Posselts, *Gedächtnissrede auf die Gefallenen.*)

PHACOCHŒRUS. [SUIDÆ.]

PHAEDRUS, a Latin writer of the Augustan age, according to the general opinion. Little is known of his life except that it appears that he was born in Thrace, was brought to Rome in his youth as a slave, found friends at Rome, applied himself to study, and became a perfect master of the Roman language, and was made free by Augustus, who patronised him. He wrote several books of fables in iambic verse, borrowing, as he says in his prologue, his subjects from Aesop. The fables of Phaedrus have long been a favourite work, for the graceful simplicity of their style, the pointedness of their humour, and the general soundness of their morality. [FABLE.] They were first published by Pithou, in 1596, from a MS. supposed to have been written in the tenth century, and which is called the Rosamboanus MS., from the name of the owner of it. Another MS., which existed at Rheims, was destroyed by fire in the last century, but it had been previously collated with Pithou's edition, and the variations had been copied, as well as those in another MS., called Danielinus, and they have been used in the later editions of Phaedrus. The latest edition of Phaedrus has the following title:—'Phaedri Augusti Liberti Fabulæ Aesopiæ, prima editio critica cum integra varietate Codd. Pithoeani, Remensis, Danielini, Perottini, et editionis principis, reliqua vero selecta,' by J. C. Orell, 8vo., Zürich, 1832, with an 'Introduction.' Perotto, bishop of Manfredonia in the fifteenth century, made a collection of Latin fables from Phaedrus, Avienus, and others, for the instruction of his nephew, among which were thirty-two fables which are not contained in the usual editions of Phaedrus, in five books. These fables, 'Fabulæ Novæ,' were published at Naples, in 1808, as an additional or sixth book of Phaedrus. Perotto's MS. however was found much damaged, and the fables were in a mutilated state. Since that time Angelo Mai has discovered in the Vatican Library another MS. of Perotto, in a state of good preservation, with a prefatory letter of the bishop to his friend Mannus Veltrius, of Viterbo, and from this MS. the additional fables have been published in a correct form: 'Phaedri Fabulæ Novæ XXXII., e Codice Vaticano reintegratæ ab A. Maio, Supplementum Editionis Orellianæ,' Zürich, 1832. There seems little doubt now that these fables belong to Phaedrus; they are perfectly similar in style and manner to the rest. The Fables of Phaedrus were also edited by Bentley, and appended to his edition of Terence.

PHÆNICORNIS. [SHRIKES.]

PHÆNO'GAMOUS or PHANÉRO'GAMOUS plants are those which have visible flowers and seeds. The words are used indifferently in contradistinction to Cryptogamous, which includes those plants which either have no sexes or none which are distinctly visible.

PHA'ETON (Ornithology). [TROPIC BIRD.]

PHAKELLOPLEU'RA, the Rev. Lansdown Guilding's name for a genus of *Chitons*, with rather small dorsal plates, and the fleshy zone ornamented with a broad single row of elongated spiculate fasciculi. Example, *Chiton fascicularis*. [CHITONS, vol. vii., p. 96.]

Mr. Swainson (*Malacology*, 1840), not having analysed this tribe, has adopted the genera and arrangement of Guilding. (*Zool. Journ.*, vol. v., p. 25.) Mr. Guilding's genera are:—

1. *Chiton*, which he divides thus:—

*

Zone distinctly scaly.

† Disk subcarinate, transverse-marginal areola distinct. Example, *Chiton squamosus*, Sowerb., *Gen.*, f. 2; *Ch. Capensis*, Gray, &c.

†† Disk rounded, smooth; areola angulate and obsolete. Example, *Chiton marmoratus*, Blainv.

* *

Zone slightly reticulated.

Example, *Chiton lævis*, Lowe, *Zool. Journn.*

* * *

Zone smoothed.

Examples, *Chiton marginatus*, *Linn. Trans.*, viii., p. 21, t. 1, f. 2; *Ch. latus*, Lowe.

2. *Acanthopleura.* The zone thick, fleshy, spinous, spinulous, hairy or rough, &c.

*

Zone spinous.

Example, *Chiton spinosus*, Sow., *Gen.*, f. 1.

* *

Zone spinulous.

Example, *Chiton Carmichaelis*, Gray, *Spicel.*

* * *

Zone granulous.

Example, *Chiton Asellus*, Lowe, *Zool. Journ.*

* * * *

Zone rugoso-granulous.

Example, *Chiton aselloides*, Lowe.

* * * * *

Zone hairy.

Example, *Chiton crinitus*, Wood, *Ind.*

* * * * * *

Zone villous.

Example, *Chiton Peruvianus*, Frembly.

* * * * * * *

Zone mealy (farinosus).

Example, *Chiton cinereus*, Lowe.

3. *Phakellopleura.*

4. *Chitonellus*, Lam.

*

Animal larviform.

Examples, *Ch. lævis*, Blainv.; *Ch. larviformis*, Barrow; *Ch. striatus*, Sow.

* *

Animal shorter, subovate.

Example, *Ch. latus*, Guilding.

5. *Cryptoconchus*, Blainv.

Example, *Cryptoconchus porosus*, Burrow.

See further, *Zool. Journ.*, vol. v. [Chitons.]

These subdivisions may be convenient for the purpose of arrangement; but we are not aware of any generic distinctions in the animals themselves.

PHALACRO'CORAX. [Pelecanidæ, vol. xvii., p. 381.]

PHALÆNA. [Lepidoptera.]

PHALA'NGER. [Marsupialia, vol. xiv., p. 459 et seq.]

PHALANGI'STA. [Marsupialia, vol. xiv., p. 459 et seq.]

PHALANX (φάλαγξ), a name given by the Greeks to the whole of the heavy-armed infantry in an army, but particularly to each of the grand divisions of that class of troops. The number of men composing a phalanx was various, but the general depth of the files in the body so called was sixteen men. The primary signification of phalanx is uncertain; a straight bar or rod of any material appears to have been so called, and the word may have been applied to a corps of troops, in line, from a fancied resemblance in the latter to such object. Eustathius, in his notes on the Iliad, supposes that the term was applied to bodies of soldiers from the clubs or stakes which were the arms of the primitive warriors.

According to the fabulous story in Polyænus, the first who disposed troops in a regular order for battle was Pan, the leader of the army of Bacchus in the expedition to India; he also divided the body of men so formed into two parts, designated the right and left wings, and he gave to the whole the name of *phalanx*. (*Stratag.*, lib. i.) It is easy to imagine that a disposition of troops in solid masses, such as the phalanges were, would be adopted in the earliest ages, when the military art was in its infancy, and when instinct must have led men, in time of danger, to keep themselves collected together for the sake of mutual support. In antient warfare, the success of an action depended on the power of resisting the shock of an enemy's charge, and hence it was important to have the bodies of infantry arranged in deep order, that they might maintain unbroken their position on the ground.

The Greek troops are represented by Homer as so disposed, and the word *phalanges* is, in several parts of the Iliad, applied to the masses of the combatants, both Greeks and Trojans:

> Ἀμφὶ δ' ἄρ Αἴαντας δοιοὺς ἵσταντο φάλλαγγες

(*Il.*, xiii. 126; see also *Il.*, iv. 332, vi. 83); and the close order of the Greeks previously to coming into action is described in *Il.*, xiii. 130, and the succeeding lines.

A like disposition prevailed among the Egyptians in the earliest times of their monarchy, and of this fact some interesting vestiges are preserved in the sculptures on the walls of the temple at Ipsambul and of the palace at Luxor. At the former place an Egyptian army is represented as marching in separate divisions of chariots and foot soldiers drawn up in quadrangular bodies, in ranks, and in close order. Each man of the infantry is armed with cuirass and helmet, and carries a shield and a short javelin; and among the figures is that of Sesostris in full panoply, standing in a highly ornamented car. (Rosselini, *I Monumenti dell' Egitto*, plates 87 to 103.) But, from the nature of the arms and the apparent discipline of the troops, it may be inferred that, at the epoch to which the monuments relate, the tactics of the Egyptians were in a very advanced state, and consequently that the order of battle there represented was in use among that people at a time much more remote than the age of Sesostris.

The antient Jewish army, modelled probably on that of the people who had long held them in servitude, was divided into bodies of 1000 men each, which were again divided into companies of 100 men (2 *Sam.*, c. 18); and it is plain, from other passages in the Scriptures, that these were further subdivided into sections. It consisted both of heavy and of light armed troops: the former wore helmets, coats of mail, and greaves, and in action they carried bucklers and used both spears and swords; the latter also carried shields and used bows or slings. The men who, from the different tribes, assembled at Hebron to confirm the election of David, are described as being armed with spear and shield, and their discipline is indicated by the expression—they could keep rank.

The troops in the army of Crœsus are said by Xenophon to have been drawn up in vast masses, the depth of the Lydians being thirty men, while that of the Egyptian auxiliaries was one hundred; and it is added that the whole army had the appearance of three great *phalanges*. (*Cyropædia*, lib. vii.) It is sufficiently evident therefore that the deep order of battle, with a regular arrangement of the men in rank and file, and some systematical division of the phalanx into sections, prevailed in the earliest times; but it is to the Greek writers that we must go for an account of the particular scales of subdivisions by which the evolutions of the phalanx on the field of battle were facilitated, and which, joined to the high discipline of the troops, gave to the body so denominated the reputation which it enjoyed till the fall of the Macedonian kingdom. The formation of such scales of subdivisions, and some changes in the arms or armour of the men, are probably what are meant when it is said that Lycurgus, Lysander, and Epaminondas introduced the *phalanx* among the Lacedæmonians, the Argives, and the Thebans. The Macedonian phalanx, the formation of which is ascribed to Philip, the father of Alexander, appears to have been a body of 6000 men, chosen for their good military qualities, particularly well armed, and subject to certain strict regulations. And its efficiency was so great, that the name of the country became afterwards very generally applied to what was in reality the usual designation of the bodies of heavy-armed infantry in the Grecian armies.

Xenophon, though constantly using the word *phalanx* in speaking of the whole body of troops which he commanded in the retreat from Cunaxa, when he has occasion to mention the formation or employment of a small body of men for any particular purpose, gives it the name of λόχος, and such body appears to have consisted either of 50 or 100 men. On one occasion, some lochi being detached from the army, two of them, amounting to 100 men, are said to have been cut off (*Anabasis*, lib. i.); and at another time, from an apprehension that the order of the phalanx would be broken in ascending a mountain, the army was divided into separate lochi of 100 men each. (*Ib.*, lib. iv.) But in the 'Cyropædia' (lib. ii.) a division of 100 men is called τάξις, and this is stated to have been subdivided into sections of ten and of five men each.

The scale just hinted at was probably peculiar to the Athenian army, for Xenophon describes the Spartan troops as formed into six μόραι, each commanded by a polemarch; he adds also that the mora was divided into four λόχοι, eight πεντηκοστὺς, and sixteen ἐνωμοτίαι. (*De Repub.*, lib. xi.) The mora is said to have consisted of 600 men, but its strength appears to have varied considerably at different times.

The only existing works expressly written on the subject of the Greek tactics are those of Ælian and his abbreviator Arrian, and these authors lived in the time of Hadrian and Antoninus, that is, long after the age in which the phalanx was superseded by the legion. Therefore, since their descriptions do not agree with what we find concerning the phalanx in the works of Thucydides and Xenophon, it seems reasonable to conclude that they appertain to the state of this body of troops in and subsequent to the times of Philip and Alexander. Ælian makes the phalanx to consist of 16,384 men of the class called ὁπλίται, or heavy-armed infantry; but this must be understood to be the whole body of that denomination in an army, and to be composed of four simple phalanges. Joined to the phalanx is a division (ἐπίταγμα), consisting of half that number of men of the class called ψιλοί, or light-armed troops, and another, called also an epitagma, of cavalry (ἱππεῖς), consisting of one-fourth of the number.

The *peltastæ* (πελτασταί), who are also mentioned by Ælian, but not as appertaining to the phalanx, united in some measure the firmness of the heavy with the agility of the light armed men. They were first instituted by the Athenian commander Iphicrates, and in the course of time they became very numerous in the Greek armies: they served as the guards of the princes, and were often reckoned among the heavy-armed troops.

The number above mentioned is expressly said to have been chosen because it is continually divisible by 2, and thus admits of a very simple distribution of numbers for the subdivisions. What really was the strength of the phalanx when in the field, during the existence of the Macedonian monarchy, is uncertain, and probably it varied much. The army of Alexander at the battle of Arbela is said to have consisted of two great phalanges, each divided into four parts, which were also called by that name; there were besides, two divisions of *peltastæ;* in all, according to Arrian, 40,000 infantry: and there were 7000 cavalry. (*Exped. Alex.*, lib. iii.) At the battle of Raphea, between Antiochus and Ptolemy, there is said to have been a phalanx of 20,000 men in the army of the former. (Polyb., lib. v., c. 8.)

The simple phalanx, according to Ælian, consisted of 4096 men; one half of that number, or 2048 men, constituted the merarchy (μεραρχία); and one-fourth, or 1024 men, was called a chiliarchy (χιλιαρχία). One-fourth of the last constituted a syntagma (σύνταγμα), or xenagy (ξεναγία), which was a complete square of 16 men each way; and the lowest subdivision was called lochus (λόχος), decuria (δεκάς), or enomoty (ἐνωμοτία), which is, by that writer, considered as a single file of 16 men. The officers do not appear to be included in the numbers of the different divisions: each xenagy had its own chief or captain (συνταγματάρχης) at the head, and a lieutenant (οὐραγός) brought up the rear. The leader of a single file is called by Ælian a decurion, perhaps because originally the file consisted of 10 men. A phalangarch commanded each phalanx.

Ælian divides the epitagma of light troops into sections, each of which has half the strength of the corresponding division in the phalanx; the lowest division is the lochus or file, which consists of 8 men. The epitagma of cavalry is divided in the same proportions as the bodies of infantry, down to the lowest subdivision, which is called ἴλη, and is made to consist of 64 men.

The phalangists were armed with helmets, cuirasses, and greaves; and in the early ages they carried an oval buckler and a pike, the latter about 10 feet long. The change introduced by Philip in the arms of the oplitæ consisted in the substitution of a larger shield, and of the σάρισσα, a pike from 18 to 20 feet in length. The arms of the peltastæ seem to have differed from those of the oplitæ chiefly in the buckler (from whence their designation is derived) being round and only about two feet three inches in diameter, and in the pike being short. It is said that Iphicrates, instead of a metal cuirass, allowed to this class of troops only a corslet of strong linen; but apparently this regulation was not always followed. The light-armed troops were frequently provided with a helmet only, and their arms were small javelins, bows, or slings.

A phalanx, in line, was considered as being constituted of two equal parts or wings (κέρατα); there was no central division, but the place of junction of the two wings was called the ὀμφαλός. In the usual order of battle it was drawn up with its front parallel to that of the enemy, but it not unfrequently happened that one wing was kept retired. This last method was practised by Epaminondas at the battle of Leuctra; the wing engaged was strengthened so as to have 50 men in depth, and the line gradually diminished to the opposite extremity, where it was only six men deep. Sometimes also two phalanges advanced in columns, with their heads united, the two lines gradually diverging to the right and left; and this is that disposition which was called ἔμβολον, or the wedge.

The phalanx was frequently drawn up in the form of a quadrangle, which might be solid or hollow, according to circumstances; and this disposition was called the plinth (πλινθίον), or the plæsium (πλαίσιον). When a double phalanx was formed with their fronts in reversed positions, the order was called αμφίστομος. The order called αντίστομος seems to have been similar to the last, except that the men faced in opposite directions, from the centre towards the wings.

When standing at open order, each soldier in the phalanx was allowed a square space about six feet each way; but when prepared for action, this was reduced to three feet, and occasionally to about eighteen inches. The file-leaders and the rear-rank men were always chosen from the best of the troops, for on the first depended chiefly the success of the charge, and the latter performed the important duty of urging on the men immediately before him, in order that the whole body might not give way by the counter-pressure of the enemy's mass.

After the introduction of the Macedonian sarissa above mentioned, the phalanx might present a formidable array of five ranks of such weapons projecting horizontally before the front of the line; for, admitting the men to be three feet from each other in depth, and that each man held in his hands about six feet of the length of the weapon, the point of that which belonged to the fifth man would project two feet beyond the file leader. Ælian also mentions another and perhaps a preferable practice, which was that of giving to the men from the first to the third or fourth rank spears successively longer in proportion to the distance of the rank from the front; in which case all those weapons must have projected equally before the line of troops.

The position of the phalanx was sometimes changed by a wheel of the whole body on either extremity as a pivot; and this was done with the men drawn up in close order. But the reversion of the front was performed in one of the three following ways:—The Cretan method, as it was called, consisted in making each file countermarch almost upon the ground it occupied, the file-leader going to the right-about, and moving to the rear, all the men of the file following him till the rear-rank man came into the line which was before the front. The Spartan method was also performed by a countermarch, but the file-leader moved to the rear, followed by the other men, till he arrived at a distance from his first place equal to twice the depth of the phalanx, the rear-rank man only changing his front. Lastly, the Macedonian method was performed by the front-rank man going right about on his own spot, the others passing him in succession and arranging themselves behind him. These movements appear to have been preferred by the Greeks to a simple change of front to be effected by making each man turn upon the ground he occupied, since they allowed the file-leaders to constitute always the foremost rank of the line.

The number of men in front of the phalanx was doubled by causing every second man in the depth to move up to the interval between every two men in the rank immediately before him; thus reducing the depth of the phalanx to eight files without extending the front. And when the front was to be extended without increasing the number of men in it, the troops merely, by a flank movement, opened out from the centre each way. Arrian justly observes that these evolutions should be avoided when in presence of the enemy; and he adds that it would be preferable to extend the front by bringing up cavalry or light troops to the wings.

On a march, the phalanx was thrown into a column, whose breadth depended on that of the road; and a formation of some separate bodies, consisting of 100 men each, for the purpose of protecting the main body while returning to its former order after having passed a defile, is mentioned by Xenophon (*Anabasis*, lib. iii.) as being then, for the first time, employed. The march of two phalanges in parallel and contiguous columns is stated to have been sometimes made by the columns keeping their proper fronts towards the exterior; but sometimes both columns were in like positions, the front of one and the rear of the other being towards the exterior, on the two sides of the line of march.

The strength of a Grecian army consisted in the deep array of its heavy infantry. No body of men less protected by defensive armour could make any impression upon the solid phalanx: and the latter, by the momentum of its charge, could not fail to overwhelm any troops who were differently formed. But the advantage of the phalanx, while it continued embodied, did not extend beyond the immediate field of battle; and the enemy, if he thought proper to decline an engagement, could, without interruption, except that which might arise from the light-armed troops and cavalry, ravage the country, and by cutting off its supplies compel the army to retreat. The phalanx moreover could only be advantageously employed on ground which was nearly level and free from obstacles; since whatever tended to derange its compact order, necessarily diminished or annulled the effect of its charge. At the battle of Issus, the phalanx of Alexander, while in a state of disorder, as the troops were passing the river, was engaged with the Greeks in the service of Darius; and though it succeeded in repelling the enemy, it sustained considerable loss. (Arrian, *Exped. Alex.*, lib. ii.)

Polybius, in comparing (lib. xvii., extract 3) the efficiency of the phalanx with that of the Roman legion, observes that the latter never opposed the former on a line parallel to its front, but always with one wing thrown back; by which means it broke the line or else compelled the phalanx to change its disposition; in either case there were formed intervals of which the legionary soldiers could avail themselves to engage the phalangists in flank, and thus render their close array and their unwieldy weapons useless.

PHALANX. [SKELETON.]

PHA'LARIS, a tyrant of Agrigentum in Sicily, of whom very little is known. He was a native of Astypalæa in Crete. It is generally agreed that he reigned sixteen years, but accounts differ in regard to the commencement of this period. Eusebius and Suidas place his accession in Ol. 52 (B.C. 570); Jerome, in Ol. 53, 4 (B.C. 565). A still earlier date than the former has also been given, namely, Ol. 31, 2 (B.C. 655); but this is contradicted by the statement of Aristotle (*Rhetor.*, ii. 20, sec. 5), who speaks of Phalaris as the contemporary of Stesichorus, and by Diodorus Siculus (*Excerpta Vaticana*, xxviii., p. 25), who mentions Phalaris between Æsop and Crœsus. Phalaris was deposed and put to death by Telemachus, the great-grandfather of Theron and Xenocrates, who flourished in the time of Pindar. (*Schol. Pind.*, Ol. 3, 68.) Phalaris was infamous for his cruelty, and especially for the particular device, which he owed to Perillus, of burning the victims of his savage tyranny in a bull of bronze, in order that he might enjoy the pleasure of hearing their cries. (Cic., *De Republ.*, iii. 30, sec. 41.) This appears to have been the tradition widely spread even in the time of Pindar, who says (*Pyth.*, i. 95):—'Crœsus's reputation for hospitality fades not away, but an evil report everywhere attaches itself to the cruel Phalaris, who burned people in a brazen bull; nor is he praised in festal meetings where the harps resound in the hall and where the youthful choruses sing.' Perillus, the maker of the bull, was the first of those who perished in this way; and when Phalaris was deposed, the mob rose against him, and practised upon him the same cruelty to which he had often subjected others. (Cicero, *Off.*, ii. 7, § 26; *De Nat. Deorum*, iii. 33, § 82; *Verr.*, v. 56, § 145; *De Fin.*, iv. 23, sec. 64.) Ovid, *Ibis*, 439, says that his tongue was first cut out (*lingua prius ense resecta*); and Heracleides Ponticus, that his mother and his friends were burnt with him. The other accounts of his death are not trustworthy. (Bentley's *Phalaris*, p. 135.) This bull was carried to Carthage: the image which was shown by the people of Agrigentum in the time of Timæus was not the bull of Phalaris, but a representation of the river Gela; the bull of Phalaris was however afterwards restored to the Agrigentines by Scipio. (Cic., *Verr.*, iv. 33, sec. 73; Diodorus Siculus, p. 614, 90.) On the bull of Phalaris, see Ebert, Σικελίων, Regiomont., 1830, p. 10, seqq.) There were other stories about this tyrant: as that he was an eater of human flesh (Aristot., *Ethic. Nicom.*, vii. 5, § 7); that he used to devour sucking children (Clearchus, apud Athenæum, p. 396); and that he even fed upon his own son (see the passages quoted by Bentley, *Phal.*, p. 369). The name of Phalaris is best known in modern times from the celebrated controversy between Bentley and Boyle with regard to the authenticity of the epistles attributed to him, the spuriousness of which was most satisfactorily established by Bentley in his admirable 'Dissertation on the Epistles of Phalaris.' These epistles, which were probably written by some rhetorician or sophist in the time of the Cæsars, are utterly worthless in a literary point of view, though Sir William Temple ventured to select them as one of the greatest works of antiquity. They have been reprinted several times since Boyle's notorious edition. The best edition is that by Schäfer (*Phalaris Epistolæ, Gr. et Lat., cum notis Lennepii, Valckenaerii, et Schaeferi*, Lips., 1823).

PHA'LARIS, a small genus of grasses, of which the seed of one of the species is extensively employed as food for birds, and commonly known as Canary seed. The species of the genus are found in warm parts of the world; but *Phalaris canariensis*, a native of the Canary Islands, is naturalised in Europe, and is the only one which is cultivated. The seed is imported into the South of Europe from Barbary. It is also cultivated in the Isle of Thanet and some other parts of Kent. It is sown in February and reaped about the end of September, but being a plant of southern climates, and late in ripening its seed, it is an uncertain crop. The produce is from thirty to forty bushels per acre, but sometimes even fifty bushels are obtained.

PHA'LAROPE. [SCOLOPACIDÆ.]

PHA'LERIS. [AUK, vol. iii., p. 100.]

PHALE'RUM. [ATHENS.]

PHALLU'SIA, M. Savigny's name for a subgenus of Ascidians, which differs from *Cynthia* in not having the branchial sac plicated; their test or case is gelatinous. [CYNTHIA; BOLTENIA.]

PHANERO'GAMOUS. [PHÆNOGAMOUS.]

PHANODE'MUS, an historian of Athens, is referred to by Dionysius of Halicarnassus, as having written upon Attic antiquities. (Hoffmann's *Lexicon;* Fabricius, *Bibl. Græca.*) Fragments of Phanodemus, together with some of Demon, Clitodemus, and Ister, were edited by Siebelis, 8vo., Leipzig, 1812.

PHA'RAMUM, De Montfort's name for a genus of microscopic *Foraminifera*, generally arranged under the genus *Robulina* of D'Orbigny. [FORAMINIFERA, vol. x., p. 348.]

PHARISEES, a sect among the antient Jews. The name is derived from the Greek Φαρισαῖοι, and this most probably from the Hebrew פָּרַשׁ, *parash*, to separate. Suidas says, 'The Pharisees are by interpretation ἀφωρισμένοι (the separated), because they divided and separated themselves from all others, in exactness of life and in attention to the injunctions of the law.'

The origin of this sect is unknown. Josephus, who was himself one of the Pharisees, speaks of them as flourishing long before he was born. He says (*Antiq.*, b. 13, c. 9), 'At this time (about 150 B.C.) there were three sects of the Jews, the Pharisees, the Sadducees, and the Essenes.' On several occasions he describes the Pharisees as the chief sect, and as possessing great authority among the people.

They believed in the existence of angels and spirits, and held the doctrine of the resurrection; but their notion of the latter appears to have been Pythagorean, namely, that there is a resurrection of the soul only by a transmigration into another body. From the benefits of this resurrection they shut out all the notoriously wicked, consigning them at once to eternal misery, upon the separation of the soul from the body. While the Essenes maintained that all things were ruled by absolute fate, and the Sadducees that all things were under human control, the Pharisees adopted a middle course, maintaining that some things were predestinated, and others left for men to determine. It was a leading maxim of the Stoics that some things were in our power, and others not in our power; and Josephus tells us that the sect of the Pharisees was very much like that of the Stoics.

But they were mainly distinguished by their zeal for 'the traditions of the elders,' to which they attached an importance equal to that of the Mosaic writings; and it was from a strict adherence to these traditions, as well as from an observance of the punctilios of the law itself, that they were called Pharisees. Several of these traditions are mentioned in the New Testament, but they are only a small portion of the whole. 'To go through them all,' says Prideaux, would be to transcribe the Talmud, a book of twelve volumes in folio.'

The Pharisees are represented in the New Testament as a hypocritical, proud, and arrogant people, pretending to be emphatically 'the separated,' trusting to themselves that they alone were righteous, and despising all other men. This was their character as a body; but there were among them individuals free from these bad qualities, such as Nicodemus, Joseph of Arimathæa, Gamaliel, and, as some think, Simeon, who uttered the hymn called 'Nunc dimittis,' to whom must be added Josephus, their historian.

(Josephus, *Antiq.*, xiii. 9, 18; xvii. 3; xviii. 2; *De Bell. Jud.*, ii. 7; *De Vitâ suâ;* Suidas, Φαρισαῖοι; Prideaux, *Connection.*)

PHARMACOLITE, native arseniate of lime; it occurs crystallized and fibrous, and there is a variety, called haidingerite, which differs in crystalline form and composition.

The primary form of pharmacolite is an oblique rhombic prism. Cleavage parallel to the oblique diagonals of the terminal planes. Fracture uneven. Hardness 2·0 to 2·5; easily scratched. Colour white. Lustre vitreous. Transparent; translucent; opaque. Specific gravity 2·640 to 2·8.

Fibrous pharmacolite occurs in white diverging needles and small globular and botryoidal masses, which are frequently coloured by arseniate of cobalt.

When heated by the blowpipe, pharmacolite emits the alliaceous smell, and fuses with difficulty into a white enamel; it dissolves in nitric acid without effervescence.

This mineral is found at Andreasberg in the Harz, and in Thuringia, and at Wittichen, near Fürstenberg in Germany, and some other places.

The pharmacolite of Wittichen was analyzed by Klaproth (1), and that of Andreasberg by John (2); the results were

	(1)	(2)
Arsenic Acid . .	50·54	45·68
Lime . . .	25·00	27·28
Water . . .	24·46	23·86
	100·	96·82

Haidingerite.—Primary form a right rhombic prism. Cleavage parallel to the short diagonal of the terminal planes, very distinct. Hardness 2·0 to 2·5. Colour white, and streak the same. Lustre vitreous. Translucent; transparent. Specific gravity 2·84. It accompanies the pharmacolite of Baden, and was found by Dr. Turner to consist of arseniate of lime 85·68, water 14·32.

PHARMACOPŒIA, a book published by the colleges of physicians with the sanction of government, containing directions for the preparation of medicines.

PHA'RMACY, in a comprehensive sense, means the department of natural science which treats of the collection, preparation, and preservation of medicines, and also of the art of dispensing them according to the formulæ or prescriptions of medical practitioners. It is however more commonly used in a limited sense, as a branch of chemical science, and termed pharmaceutical chemistry, or the application of the laws of chemistry to those substances which are employed for the cure of diseases, so as to render them more commodious, or their administration more easy, and their action more perfect and certain. It should not be understood as merely depending upon some mechanical processes, such as trituration, rasping, or other means of subdivision, or even the simpler chemical actions involved in the processes of infusion or decoction, but as requiring a knowledge of vegetable physiology, and an acquaintance with the chemical constitution of the substances to be prepared. In many continental nations this department is the subject of very strict legal enactments, and forms an important part of medical police, especially as regards the dispensing of poisonous drugs; while in Britain any one who chooses may affix the terms chemist and druggist to his name, and may deal in the most useful or dangerous ingredients, without that previous education which would fit him to be the appropriate assistant of the physician, whose most judicious plans are often frustrated by the ignorance or carelessness of those to whom the compounding of his prescriptions is entrusted. [Materia Medica.]

PHA'RNACES. [Pontus.]

PHAROS. [Alexandria.]

PHARSA'LIA. [Cæsar; Thessaly.]

PHARYNX is the cavity in which the food is received in its passage from the mouth to the œsophagus or gullet. In man it is somewhat funnel-shaped, having its widest part above, where it is fixed to the base of the skull. The nasal passages, the mouth, and the air passages, open into the pharynx in front; behind, it is attached to the spinal column; and at its sides it is bounded by the deep vessels and muscles of the neck. It is lined by a mucous membrane, but is chiefly composed of layers of strong muscular fibres, called the constrictors of the pharynx, by whose successive contractions the food received from the mouth is gradually forced from above downwards into the œsophagus.

PHASCALOTHE'RIUM. [Marsupialia, vol. xiv., p. 466.]

PHASCO'GALE. [Marsupialia, vol. xiv., p. 456.]

PHASCOLA'RCTOS. [Marsupialia, vol. xiv., p. 461.]

PHASCO'LOMYS, M. Geoffroy's name for the *Wombat.* [Marsupialia, vol. xiv., p. 463, et seq.]

PHASE (φάσις, *phasis*, appearance). When a phenomenon changes its character gradually, any particular state which it is necessary to distinguish is called a phase. Thus we have the phases of the moon, meaning the different forms which the enlightened part takes during the month; the phases of the weather, meaning the succession of heat and cold, wet and dry, &c.

PHA'SEOLUS, a genus of plants of the tribe Phaseoleæ, in the natural family of Leguminosæ. The name is said to be derived from *phaselus*, a little boat, which the pods are thought to resemble; but it may be that the meaning of 'boat' is derived from the resemblance of a boat to the form of a bean. Two species are very well known in this country, *P. vulgaris*, the common Kidney bean, and *P. multiflorus*, the Scarlet runner; their unripe pods being much esteemed as legumes, and also for pickling. The ripe seeds are however employed on the Continent, and form the *haricots* of the French. The genus is however one of which the species are indigenous in tropical parts both of the Old and New World. Several are cultivated in India, and are some of the principal articles of the agriculturist's attention, as the ripe seeds of several species form pulses which are much used by the natives as a portion of their diet, and some of which, like the Kidney bean, abound in nutritious matter.

The genus Phaseolus is characterised by having a bell-shaped two-lipped calyx. The corolla is papilionaceous, and has the keel, as well as the diadelphous stamens and the style, spirally twisted. The Legume is compressed or cylindrical, with two valves, and is many-seeded, with more or less conspicuous cellular partitions between the seeds. The hilum of the seed is oval oblong. The plants are herbaceous or suffrutescent in habit. The leaves are pinnately trifoliolate, the leaflets with partial stipules. Racemes axillary. Pedicels usually in pairs, single flowered.

Phaseolus vulgaris (Kidney Bean) is said to be a native of India, but Dr. Royle states that seeds were brought to him from Cashmere, and he is therefore inclined to consider that it was introduced into Europe from the most northern parts, such as Caubul and Cashmere, and that this accounts for our being able to cultivate it at a lower temperature than other species of the genus. *P. multiflorus*, or the Scarlet runner, is a native of South America. Both are delicate, and cannot be safely planted in the open air till the beginning of May. In a stove or pit, green pods of the dwarf kinds may be gathered all the winter, and they have this advantage, Mr. Loudon observes, over forced productions of the fruit kind which require to be ripened, that the pods are as good from plants in the stove in midwinter, as from those in the open garden in midsummer. The Kidney bean is an article of field culture in France, America, and in most warm countries. Speechley suggests that it might become an object of field culture in this country, and be useful in times of scarcity more especially, as on good land it will flourish and grow luxuriantly even in a dry parching season, in which respect it differs from most other culinary vegetables.

In India several species of Phaseolus are extensively cultivated:—

Phaseolus Mungo, or Moog, is one of the dry leguminous grains of India, which are of great value whenever the periodical rains fail and rice cannot be grown, and famine is the consequence. It requires a strong rich dry soil, and is raised in the greatest quantities on rice lands during the cold season. In from seventy-five to ninety days it is ready to cut, and yields about thirty-fold. The ripe grain is well tasted, nutritious, and is considered wholesome.

P. Max., Kala Moog of the natives, and black Gram of the English, is like the former, but distinguished by its black seeds, and is, like it, found in a cultivated state: it takes about the same time to ripen, and yields nearly the same produce.

P. radiatus, called by the natives Mash and Oorud, is, like the two former, found in a cultivated state, and is the most esteemed of all the Indian leguminous plants. Besides using it as an article of diet, the natives make bread of the meal for some of their religious ceremonies.

P. aureus, or Sona Moog of the Bengalees, is found in a cultivated state in the Bengal presidency, but is not known on the Coromandel Coast. It is sown, like the others, about the end of October or beginning of November, and reaped in February on the beginning of March.

P. aconitifolius, Moth of the natives, is cultivated in the north-western provinces, and used for feeding cattle.

PHASES OF THE MOON. [Moon.]

PHASIANE'LLA. [Trochidæ.]

PHASIA'NIDÆ. [Pavonidæ; Pheasants.]

PHASIS (*Φάσις*), the principal river in antient Colchis, and called at present the Faz, and sometimes the Rion, rises in Armenia, according to Strabo (xv. 498), and among the Moschi, according to Pliny (*Hist. Nat.*, vi. 4). It flows in a westerly direction into the Black Sea. It was navigable in antient times for large ships for thirty-eight miles from the coast, and for smaller vessels as far as the fort of Sarapana (*Sharapan*), on the boundaries of Colchis and Iberia, from which place goods were conveyed by waggons in four days to the river Cyrus. (Strabo, xv. 498; Plin., *Hist. Nat.*, vi. 4.) There are no antient remains at Sharapan. The Phasis was sometimes considered as the boundary between Asia and Europe (Herod., iv. 45), and was regarded in the time of Augustus as the northern boundary of the Roman dominions in that part of Asia. (Strabo, vi. 288.) The Phasis received many affluents, of which the principal were the Glaucus and the Rion, by the latter of which names the Phasis itself is sometimes called. The Glaucus appears to be the modern Quirilla, which comes from Elburz. From the junction of the Rion and Quirilla the river is navigable for boats at all seasons, has no obstructions, and is from twenty to thirty feet deep, with a current of about two miles and a half an hour. It flows through a level country, which is lower than the banks of the river. There is a bar at the mouth of the Phasis, with only six feet water, the only circumstance that prevents the river being entered by the largest vessels. The navigation of the Phasis is now entirely in the possession of the Russians. At Poti, near the mouth of the Phasis, the Russians have a station or castle. Kootais on the Rion is the seat of the Russian government of Imirétia.

In antient times there were one hundred and twenty bridges over the Phasis (Strabo, xv. 500; Plin., *Hist. Nat.*, vi. 4), and many towns upon it, of which the most important were Æa, the old capital of the Æetes, which is celebrated in the legends of the Argonautic expedition [Argonauts], and Phasis (*Poti*), situated at its mouth. There are no remains of antiquity on the Phasis. On the banks of the river there were in antient times, as is also the case at the present day, great numbers of pheasants, which are said by Martial (*Epig.*, xiii. 72) to have been brought into Greece by the Argonauts, and to have been called Phasiani, from this river.

The Phasis was noted in antient times for the excellence and purity of its waters. Arrian, in his 'Periplus of the Euxine Sea,' informs us that water taken from it will preserve its goodness for ten years; and though this is doubtless an exaggeration, it serves to show in what high estimation its waters were held at that time. [Georgia, p. 176.] (*London Geog. Journal*, vol. iii., p. 33, &c.)

PHAVORI'NUS VARINUS, a native of Favera, a place near Camerinum in Italy, whence he called himself Favorinus, in Greek Phavorinus (Φαβωρίνος). His family name was Guarino, which he turned into Varinus (Βαρίνος). He is also called Camers, from the town of Camerinum. The precise time of his birth is unknown, but it was probably some years after the middle of the fifteenth century. He is represented, about 1490, as a pupil of Angelo Poliziano, and as exquisitely skilled in Greek and Latin. He devoted himself to the service of the church, and joined the order of the Benedictines. In 1512 he became librarian to Giovanni de' Medici, afterwards pope Leo X.; and in 1514 he was made bishop of Nuceria, over which diocese he presided twenty-three years. He died in 1537.

Phavorinus, assisted by two other eminent scholars, Charles Antenoreus and Aldus Manutius, edited, in 1496 'Cornu Copiæ et Horti Adonidis,' consisting of seventeen grammatical tracts in Greek, selected from thirty-four antient grammarians. In 1517 he published a collection of apophthegms from Stobæus, which he dedicated to Leo X. But the work by which he is chiefly known is his Greek Lexicon, which, after the labour of many years, he completed in the lifetime of Leo X. It was published at Rome in 1523, fol., and reprinted at Basle in 1538, fol., under the direction of Joachim Camerarius, with several improvements. The last edition, still further improved, was printed at Venice, in 1712, by Antony Bortoli, in a neat type and in a handsome form. The first edition is beautifully printed and the paper is excellent; but the edition of 1712 is by far the best for all the purposes for which a lexicon is consulted. This very useful lexicon is compiled from the various preceding lexicons, grammars, &c., or, as the title expresses, 'from many and different books.' The words are given in alphabetical order, and all the definitions and explanations are in Greek, which Phavorinus is said to have spoken and written as well as a native Greek. Henry Stephens appears to have been greatly indebted to the work of Phavorinus in the compilation of his Greek Lexicon, though he nowhere acknowledges his obligation.

(Fabricius, *Bibliotheca Græca;* Roscoe, *Life of Leo X.; Quarterly Review*, vol. xxii.)

PHEASANTS. If we owe to America that useful and sapid bird the Turkey, we are indebted to Asia for those equally desirable additions to our homesteads, preserves, and farm-yards, the *Peacocks*, the *Pheasants*, and our common *Poultry*.

The views of Mr. Vigors and some other ornithologists with regard to the *Phasianidæ* are sketched in the article Pavonidæ.

Mr. G. R. Gray arranges the *Phasianidæ* as the second family of *Rasores*, *Cracidæ* being the first; and he divides the *Phasianidæ* into the subfamilies *Pavoninæ*, *Phasianinæ*, *Gallinæ*, and *Meleagrinæ*. The *Pavoninæ* and *Meleagrinæ* are noticed in the article Pavonidæ. The *Phasianinæ* consist of the genera *Argus*, *Phasianus*, *Syrmaticus*, *Thaumalea*, and *Gennæus*. The *Gallinæ* comprehend the genera *Euplocamus*, *Monaulus*, *Lophophorus*, *Gallus*, and *Tragopan*.

Phasianus. (Linn.)

Generic Character.—*Bill* of mean length, strong; upper mandible convex, naked at the base, and with the tip bent downwards. *Nostrils* basal, lateral, covered with a cartilaginous scale; cheeks and region of the eyes destitute of feathers, and covered with verrucose red skin. *Wings* short, the first quills equally narrowed towards their tips, the fourth and fifth the longest. *Tail* long, regularly wedge-shaped, and composed of eighteen feathers. *Feet* having the three anterior toes united by a membrane as far as the first joint, and the hind toe articulated upon the tarsus, which, in the male birds, is furnished with a horny cone-shaped sharp spur. (Gould.)

The type of this genus is generally considered to be the *Common Pheasant, Phasianus Colchicus*, Linn., a bird which, though not originally British, is completely naturalised in our islands, and indeed appears to adapt itself with great facility to most countries where ordinary care is taken to preserve it and the temperature is not too low for its constitution. The species is too well known to need description, but an account of its introduction into Europe generally and into our own country particularly, together with a summary of its habits, will be expected, and we shall endeavour to lay before the readers some information on these points.

If we are to listen to the tales which form that period of history which borders upon fable, we owe this ornament to our preserves and tables to Jason and his companions, who brought it from Colchis, in the good ship Argo. Martial thus notices its introduction into Europe (lib. xiii., ep. 72): *Phasianus loquitur*—

> Argivâ primum sum transportata carinâ;
> Aute mihi notum nil nisi Phasis erat.'

In Greece it soon became known under the name of *φασιανός* (Phasianus) and *φασιανικός ὄρνις* (Phasian bird). (Aristoph., *Clouds*, 110; *Birds*, 68.) Indeed it had become sufficiently celebrated in the time of Aristophanes to form a proverb,—'Not if you would give me the pheasants which

Leogoras feeds,' says Strepsiades, in the *Clouds* (109, 110). Aristotle writes succinctly but clearly of the habits of the pheasant as a well-known bird (*Hist. Anim.*, v. 31; vi. 2); nor is Athenæus silent concerning so delicate a dish, which appears to have become more common as luxury waxed strong, nor regarding the royal conduct of Ptolemy, who, though he kept them and provided them with hens (*νομάδας ὄρνιθας*) for multiplication, being aware of their excellence for the table, appears not to have tasted them. From the same author it would appear that the antients, contrary to the opinion of modern epicures, thought the cock birds the best. (*Deipn.*, xiv., lxix., p. 654.) It is the *Phasianus* of the antient Italians (Pliny, *Nat. Hist.*, x., xlviii.; xi., xxxvii.), but seems to have only been within reach of the wealthy. Thus Martial (xiii., xlv., *Pulli gallinacei*),—

> 'Si Libycæ nobis volucres et Phasides essent,
> Acciperes: at nunc accipe cortis aves.'

and again, in the epigram addressed to Bassus (iii. 58), which gives so pretty a picture of a genuine rural Roman villa, and so agreeably fills the imagination with country sights and sounds,

> 'Vagatur omnis turba sordidæ cortis,
> Argutus anser, gemmeique pavones,
> Nomenque debet quæ* rubentibus pennis,
> Et picta perdix, Numidicæque guttatæ,
> Et impiorum phasiana Colchorum.
> Rhodias superbi fæminas premunt galli,
> Sonantque turres plausibus columbarum.
> Gemit hinc palumbus, inde cereus turtur.'

The pheasant has now been spread over the whole of temperate Europe, and the greater part of the old Continent; and it is probable that it will be introduced with success wherever the face of the country and the supply of food are congenial to it, and the temperature does not vary too much from that of its native river, the modern Rion, along whose banks Mingrelia, formerly Colchis, extends, and lies between 42° and 43° N. lat., and 41° 19′ and 42° 19′ E. long. [GEORGIA, vol. xi., p. 176; PHASIS.] It is even said to be common in Siberia, a much colder climate, which would prove the facility with which it adapts itself to temperature; and an attempt has, we believe, been made to introduce it into North America, a locality well suited to its habits.

The south of Europe owed the pheasant, in all probability, partially to the Greeks, and more proximately to the Romans; it is the *Fasiano* of the modern Italians, and *Faisan* of the French. More doubt hangs about its introduction into Great Britain, and the time of that introduction. We are told that the price of one was fourpence in the time of our first Edward (A.D. 1299). In 'The Forme of Cury,' which is stated to have been compiled by the chief master-cook of King Richard II., we find a receipt 'for to boile Fesant, Ptruch (partridges), Capons, and Curlew,' which carries us back to 1381. We read of the

> 'Fawkon and the Fesaunt both,'

in the old ballad of the 'Battle of Otterbourne.' At the 'Intronazation of George Nevell,' archbishop of York, in the reign of our fourth Edward, we find among the goodly provision, 'Fessauntes, 200.' In the 'Northumberland Household-Book,' begun in 1512, 'Fesauntes' are valued at twelve pence each. In the charges of Sir John Nevile, of Chete, at Lammas Assizes, in the twentieth year of the reign of King Henry VIII., we find twelve pheasants charged twenty shillings; and they seem to have rapidly increased in price, as, among the expenses of the same Sir John Nevile, for, as he writes it, 'the marriage of my son-in-law, Roger Rockley, and my daughter Elizabeth Nevile, the 14th of January, in the seventeenth year of the reigne of our soveraigne lord King Henry VIII.,' is the following: 'Item in Pheasants 18, 24 shillings.' We trace the birds in 'A. C. Mery Talys,'† printed by John Rastell, where we read of 'Mayster Skelton, a poyet lauryat, that broughte the bysshop of Norwiche ii. fesauntys.' Rastell began to print as early as 1517, and ceased in 1533. In Turbervile's 'Booke of Falconrie' the 'Fezant' and 'Feasants'—for, with the licence of the time, it is spelled both ways—are mentioned as the subjects of hawking, and so the bird may be traced as a dish for the table, or the object of field sports, down to the present time.

Habits, Reproduction, &c.—Hen pheasants in this country begin to lay in April, and deposit from eight or ten to fourteen olive-brown eggs, in a rough nest on the ground. Sometimes two will lay in the same nest. The young make their appearance towards the end of May or beginning of June.

Where the country is favourable, it is easy to get up a head of pheasants, with the aid of good keepers; but it is more difficult to keep them at home, for they are wandering birds, and will often leave the place where they are bred, in search of food more agreeable to them and localities more congenial to their habits. Warm covers and water are absolutely necessary; and if they are plentifully supplied with grateful food, but few of them will become vagrants. Jerusalem artichokes, potatoes, and buckwheat, as well as barley, are favourites. Small stacks of the latter grain in the straw are frequently placed about the preserves, and there the pheasants may be seen scratching at their feeding-time; but this mode of supply is objectionable, as the poacher soon finds out the several points of attraction, and avails himself of them accordingly. Mr. Yarrell states that one good mode of inducing them to stop at home is to sow, in summer, beans, peas, and buckwheat mixed together, leaving the whole crop standing on the ground. The strong and tall stalks of the beans carry up and sustain the other two, and all three together afford, for a long time, food and cover. (*Hist. of British Birds.*) The same author tells us that at the end of autumn he has found the crops of the birds distended with acorns, of so large a size that they could not have been swallowed without great difficulty. In December, 1834, we saw eight ripe acorns and a ripe hazel-nut taken out of the crop of a hen pheasant from Sussex. The acorns had begun to germinate with the heat and moisture of the crop, and they were sent up to the gardens of the Zoological Society in the Regent's Park, and there planted. For autumnal and winter home-feeding we have seen potatoes used with excellent effect, not only in keeping the birds from wandering, but in increasing their weight and fatness. Carts loaded with raw potatoes were, from time to time, driven into the covers, and the potatoes were scattered about by hand. The pheasants soon found them out and throve accordingly, without being collected together at particular spots, as they too often are to their destruction. They are very general feeders; neither blackberries, sloes, nor haws come amiss to them, and grain, seeds, and tender leaves find their way into the pheasant's crop as well as insects. Mr. Selby observed that these birds sought after the root of the acrid bulbous crowfoot (*Ranunculus bulbosus, Common Buttercup*) in May and June, and a friend informed Mr. Yarrell that they also feed on the Pilewort Crowfoot (*Ranunculus ficaria*). Mr. Selby further states that the bulb of the garden tulip is an article of diet which the pheasant omits no opportunity of obtaining; and which, however deeply buried, the bird is almost certain to reach by means of its bill and feet. The size to which these birds attain when well fed is considerable. In the catalogue of Norfolk and Suffolk birds, by the Rev. Revett Sheppard and the Rev. William Whitear (*Linn. Trans.*, vol. xv.), the weight of a cock pheasant killed at Campsey Ash, where the birds were well fed with potatoes, buckwheat, and barley, is stated at four pounds and a half. 'Some winters since,' says Mr. Yarrell, 'my friend Mr. Louis Jaquier, then of the Clarendon, produced a brace of cock pheasants which weighed together above nine pounds. The lighter bird of the two just turned the scale against four pounds and a half; the other bird took the scale down at once. The weights were accurately ascertained, in the presence of several friends, to decide a wager, of which I was myself the loser.'

Among the diseases and disorders to which the pheasant, in common with other gallinaceous birds, is subject, the fatal *gapes* holds a prominent place. The cause of this disease is an intestinal worm, which adheres to the internal surface of the trachea, and causes death by suffocation, sometimes arising from inflammation of the part, and not unfrequently by actual obstruction. This *entozoon* is *Syngamus trachealis* (*Distoma lineare* of Rudolphi, *Fasciola Trachea* of Montagu), and a most curious animal it is. The bifurcation of the anterior extremity was taken by earlier observers for a double head, and thence probably came the name *Distoma* (double-mouth); but this bifid termination is in reality due to the two sexes. The female is long; and the short male is affixed to her for life by means of an integument which holds him to her, but which, if cut open, exhibits an otherwise free and distinct animal. In the museum of the Royal College of Surgeons, Nos. 199, 200, 201 (*Preparations of Natural History in Spirit*), exhibit this destructive worm. The first shows several specimens from the trachea of a chicken; the second consists of a small portion of the trachea of a bird laid open, and exhibiting one of this species which has lost its original pink colour and become blanched in the spirit; and in the third is to be seen the trachea of a partridge completely choked up by them. Mr. Selby observes that many recipes for the cure of this fatal malady (which is provincially called the *Nax* in Northumberland) have been suggested, but that none of them seem to be effectual, except the one recommended by Montagu, namely, fumigating by tobacco, found to be an infallible specific when administered with due care and attention. The mode of administering this remedy is by putting the young pheasants, turkeys, chickens, or partridges affected into a common wooden box, into which the fumes are blown by means of a tobacco-pipe. That this often succeeds is true, but we cannot confirm its infallibility in all cases: a pinch of common salt, put far back into the mouth of the patient so as to reach the upper part of the trachea, is a neater and less operose method of cure. With reference to this, it has occurred to us that we never heard of any pigeons being affected with the gapes, and the fondness of these birds for salt is well known. We have heard of a sparrow being attacked by this *entozoon*, but we did not see the case.

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* The Flamingo.

† Alluded to in Shakspere's 'Much Ado about Nothing.'

The assumption of the plumage of the cock pheasant by the female, when, through old age or organic defect, she is no longer capable of reproducing the species, is by no means uncommon, not more rare indeed, if so much, as it is in the peafowls [PAVONIDÆ, vol. xvii., p. 334], common poultry, &c.; indeed John Hunter (*Animal Economy*) remarks that this change has been principally observed in the common pheasant. 'It has been observed,' says Hunter, 'by those who are conversant with this bird when wild, that there every now and then appears a hen pheasant with the feathers of a cock; all however that they have described on the subject is, that this animal does not breed, and that its spurs do not grow. Some years ago one of these was sent to the late Dr. William Hunter, which I examined, and found it to have all the parts peculiar to the female of that bird. This specimen is still preserved in Dr. Hunter's museum. Dr. Pitcairn having received a pheasant of this kind from Sir Thomas Harris, showed it as a curiosity to Sir Joseph Banks and Dr. Solander. I, happening to be then present, was desired to examine the bird, and the following was the result of my examination:—I found the parts of generation to be truly female, they being as perfect as in any hen pheasant that is not in the least prepared for laying eggs, and having both the ovary and oviduct. As the observations hitherto made have been principally upon birds found wild, little of their history can be known; but from what took place in a hen pheasant in the possession of a friend of Sir Joseph Banks, it appears probable that this change of character takes place at an advanced period of the animal's life, and does not grow up with it from the beginning. This lady, who had for some time bred pheasants, and paid particular attention to them, observed that one of the hens, after having produced several broods, moulted, when the succeeding feathers were those of a cock, and that this animal was never afterwards impregnated. Hence it is most probable that all the hen pheasants found wild, having the feathers of a cock, were formerly perfect hens, but have been changed by age, or perhaps by certain constitutional circumstances. Having bought some pheasants from a dealer in birds, among which were several hens, I perceived, the year after, that one of the hens did not lay, and that she began to change her feathers. The year following she had nearly the plumage of the cock, but less brilliant, especially on the head; and it is more than probable that this was an old hen, nearly under circumstances similar to those before described.' The alternative above alluded to has been proved (*Phil. Trans.*, 1827) by Mr. Yarrell, whose dissections demonstrate this change and its causes, and whose observations show that it is not uncommon. He states that certain constitutional circumstances producing this change may and do occur at any period during the life of the fowl, and that they can be produced by artificial means. The same author, in his excellent 'History of British Birds,' now in course of publication, observes that these cock-plumed hens are usually called by sportsmen and gamekeepers 'Mule Pheasants,' a designation which he considers to be correct, since some of our dictionaries show that the term *Mule* is derived from a word which signifies barren, and such hen pheasants are incapable of producing eggs, from derangement of the generative organs; sometimes an original internal defect, sometimes from subsequent disease, and sometimes from old age. He adds that he has seen this disorganisation and its effects among birds in the Gold, Silver, and Common Pheasants; in the Partridge, the Peafowl, the Common Fowl, the Crowned Pigeon, the Kingfisher, and the Common Duck: in the latter species he states that the change, in two instances, went on even to the assumption of the two curled feathers above the tail.

But we must not forget that Blumenbach, in his interesting paper 'De anomalis et vitiosis quibusdam nisus formativi aberrationibus commentatio,' read before the Göttingen Royal Society, in July, 1812, has entered fully and particularly into this subject. The species in which he had known the change of plumage to be observed were *Columba Œnas*, *Phasianus Gallus*, *Colchicus*, and *pictus*, *Pavo cristatus*, *Otis tarda*, *Emberiza paradisea* and *longicauda*, *Pipra rupicola*, and *Anas Boschas*. Alluding to the eggs which have been sold as *Cock's Eggs*, he observes, that to him it seems most probable that such specimens have been laid by hens which had either assumed the plumage of cocks from their youth up, or upon whom the change had come in their old age. Though such phenomena are usually gallinaceous, they are not confined to that family; for he relates that Professor Erhard sent to him an egg laid by a Canary Bird, that sang loudly and excellently, having all the appearance of a cock bird. The egg was one-half less than the usual size, but of the ordinary form and colour. Our limits will not allow us to quote this important memoir further; but we would particularly recommend to the attention of the reader who is studying this branch of physiology, the second, third, and fourth sections, respectively entitled *Fabricæ androgynæ phænomena—Generatio hybrida—Animalia in varietates sic dictas degenerantia*.—(*Commentationes Societatis Regiæ Scientiarum Gottingensis Recentiores, Classis Physicæ*, tom. ii.)

That hen pheasants which have begun to put on the livery of the male are not always incapable of producing eggs, is a fact for which we are indebted to Sir Philip Grey Egerton, Bart., well known for the acuteness of his observations in many departments of natural history. Sir Philip informs us that about four years ago a hen pheasant at Oulton Park, Cheshire, which had nearly assumed the plumage of the cock, laid a nest full of eggs, from which she was driven by the curiosity of persons who came to gaze at so strange a sight. She then laid another nest full of eggs, sat upon them, and hatched them; but the young all died soon after they were excluded. This is a very curious case, and seems to show that though the capacity of producing eggs still remained, the organic defect was sufficient to prevent the production of a healthy offspring.

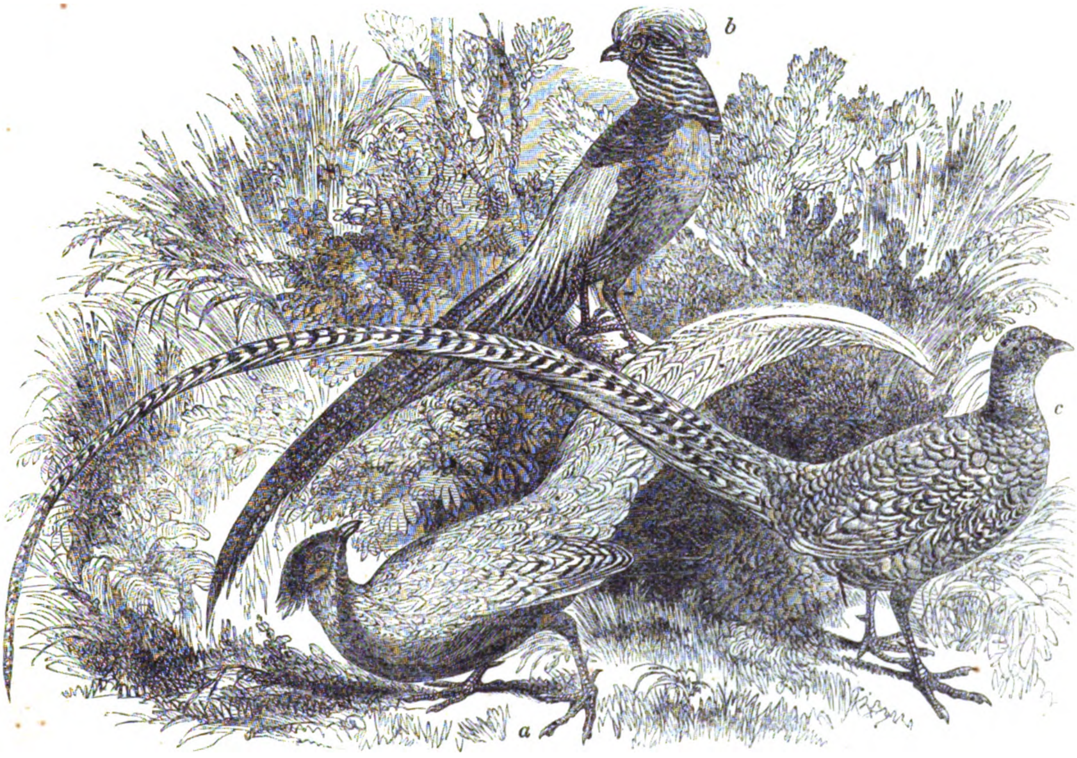
Varieties.—White and Pied: the Ring-necked and Bohemian Pheasants appear to be considered as varieties by Mr. Yarrell; Temminck and Sir W. Jardine consider the former to be completely distinct. The English reader will find the reasons for the latter opinion stated at length in that useful work 'The Naturalist's Library' (*Ornithology*), vol. iii.

HYBRIDS.

Various instances of the common Pheasant breeding with other gallinaceous birds are on record. Edwards has figured a bird supposed to have been produced between a pheasant and a turkey. Three or four of these were discovered in the woods near the house of Henry Seymour, Esq., of Handford, Dorsetshire, and he shot one in October, 1759, the bird which he sent to Edwards. Mr. Yarrell (*British Birds*) observes that he has twice been shown birds that were said to be the produce of the Pheasant and the Guinea Fowl, and the evidence of the plumage was in favour of the statement. We have seen such a bird, and its feathers corroborated the allegation that it had been so produced. In the article BLACK COCK will be found accounts of hybrids between the Cock Pheasant and the Grey Hen. Mr. Eyton, in his valuable work on the *Rarer British Birds*, adds to the account of the hybrid shot near Merrington, figured in that work, and noticed in our article, that the brood to which it belonged consisted of five: one remained in the possession of J. A. Lloyd, Esq., of Leaton Knolls; the other three, with the old Grey Hen, fell victims to a farmer's gun, and were destined to the table. Mr. Eyton further states that he had also seen another specimen killed near Corwen in Merionethshire, then in the collection of Sir Rowland Hill, Bart. Mr. Thompson of Belfast describes (*Magazine of Zoology and Botany*) another hybrid shot at Lochnaw, Wigtonshire, where it had been seen several times on the wing by persons who supposed it to be a wild turkey. In the surrounding plantations Pheasants and Black Grouse were numerous; but this individual, which was preserved for Sir Andrew Agnew, Bart., M.P., was the only one of the kind observed. Mr. John Leadbeater, in 1837, exhibited a hybrid between the Pheasant and Black Grouse, shot near Alnwick, at a meeting of the Zoological Society. This the Duke of Northumberland presented to the British Museum. Dr. Edward Moore (*Magazine of Natural History*, 1837) notices another hybrid of this kind shot near Plymouth by the Rev. Mr. Morshead, and Mr. Yarrell (*British Birds*) records his obligation to the Rev. W. S. Hore, of Stoke near Devonport, for the knowledge of two other specimens killed in Devonshire: one a fine male, in his own collection; the other believed to be at this time in the collection of Dr. Rodd, of Trebartha Hall in Cornwall. To conclude this part of the subject in the words of Mr. Yarrell:—'The last of thirteen examples of hybrids between the Pheasant and Black Grouse here recorded was killed in Northumberland, for a knowledge of which I am indebted to Mr. Selby, of Twizell House. This bird was shot early in December, 1839, by Lord Howick, in a large wood belonging to Earl Grey, a few miles to the east of Felton, and, having been sent to Twizell, I was not only immediately made acquainted with the occurrence, but Mr. Selby has since supplied me with a coloured drawing of the bird, from which the representation at p. 311 was executed.' (*History of British Birds*, May, 1840.)

The union between the common hen and the cock pheasant is by no means rare, as is well known to those whose homesteads border upon pheasant preserves: the produce of this union is called a *Pero*. Many of these, some of them very fine birds, have been kept together in the Gardens of the Zoological Society in the Regent's Park, but they never, as far as we have been able to learn, exhibited any inclination to breed. They are generally considered, as Mr. Yarrell observes, to be unproductive among themselves, all being half-bred; but the case is different when they are paired either with the true pheasant or the common fowl. Edward Fuller, Esq., of Carleton Hall near Saxmundham, has recorded that his gamekeeper had succeeded in rearing two birds from a barn-door hen, having a cross from a pheasant, and a pheasant cock, which he presented to the Zoological Society. On the same evening when these three-quarter-bred pheasants were noticed, hybrids between the Pheasant and Common Fowl, the Common Pheasant and the Silver Pheasant, and the Common Pheasant with the Gold Pheasant, were placed on the Society's table for exhibition. (*Zool. Proc.*, 1836.)

Before we leave the True Pheasants, we must notice some of the magnificent Indian species, which exhibit such a prodigality of splendour and beauty in their plumage as almost realises the birds which we read of in fairy tales. Such are the well-known gorgeous *Gold Pheasant* (*Phasianus pictus*, Linn.—Genus *Thaumalea*, Wagler, *Chrysolophus*, J. E. Gray, *Nycthemerus*, Sw.), the equally well-known delicately pencilled *Silver Pheasant* (*Phasianus Nycthemerus*, Linn.—Genus *Gennæus*, Wagler, *Nycthemerus*, Sw., *Euplocomus*, J. E. Gray), and the noble *Reeves's Pheasant* (*Phasianus veneratus*, Temm.—Genus *Syrmaticus*, Wagler). Of these forms we have endeavoured to give some representation as far as our means will permit.'



a, Silver Pheasant; *b*, Gold Pheasant; *c*, Reeves's Pheasant (Syrmaticus Reevesii)—males.

The two first of these (natives of China) are common in almost every aviary, and there is no reason why they should not thrive well if turned out in our preserves; the second species has, we believe, been so turned out with success: the last is also found in China, but, as it would seem, on the very confines of the empire. It is very rare in Pekin. Dr. Latham's description was taken from Sir John Anstruther's drawings, and from some writing under them in the Persian language it appeared that the bird was called *Doomdurour*, or Long-tail, and it was found on the snowy mountains of Surinagur.

To Mr. Reeves we are indebted for the first individual ever brought alive to Europe. It was a male, and continued to live for some time in the Garden in the Regent's Park. Tail-feathers from it were exhibited to the Society in 1831, measuring each about five feet six inches in length. A second male specimen was also sent to their menagerie by the same liberal donor in 1834. Hybrids were obtained, one of which is, we believe, still alive at the Garden, from one of these birds and the common Pheasant.

Then there are the beautiful *Diard's Pheasant* (*Phasianus versicolor*, Vieill.), which haunts the Japanese woods, and exhibits the manners and habits of our common Pheasant; the rare and elegant *Soemmering's Pheasant* (*Phasianus Soemmeringii*, Temm.), also a native of Japan: but our limits warn us, and we shall proceed to notice some observations of Mr. Vigors, which appear to us to be valuable as conducting the reader to the next form which we shall have to lay before him.

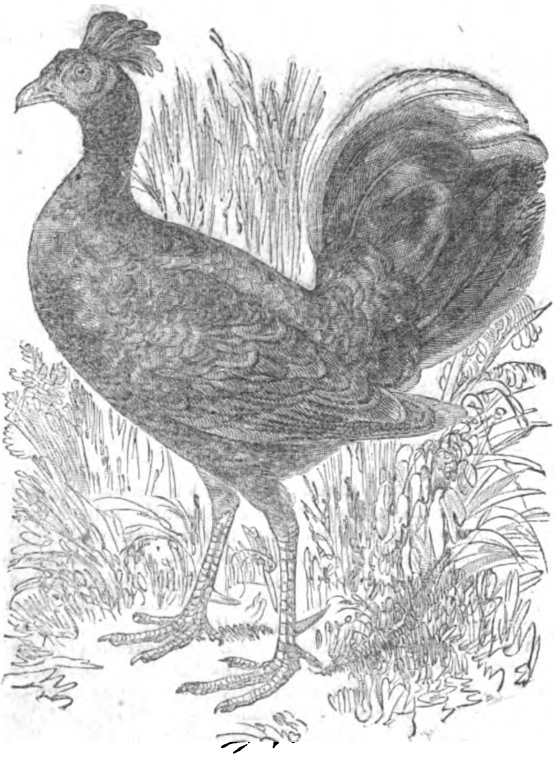
At a meeting of the Zoological Society in 1832, a male and female pheasant were exhibited from the collection, which appeared to be *Phasianus leucomelanos* of Dr. Latham. Mr. Vigors pointed out the difference between this species and *Phasianus albo-cristatus*, which he had described in the first part of the *Proceedings*, and he added that these two species, together with the *Phasianus lineatus* of Dr. Latham, exhibited to the Committee in 1831, and described in the *Proceedings* of that date, as well as the *Fire-backed Pheasant* (*Phasianus ignitus*, Lath.), formed a group among the *Pheasants*, which appeared intermediate between the typical birds of that family and the genus *Gallus*, or *Jungle Fowl*. This group, he observed, distinguished by their crests and by their tails partaking equally of the elevated character of that of the *Jungle Fowl* and the recumbent character of that of the *Pheasant*, had been set apart by MM. Temminck and Cuvier under the name of *Houppifères*, and by the former naturalist under the scientific name of *Euplocamus*.

Euplocamus. (Temm.)

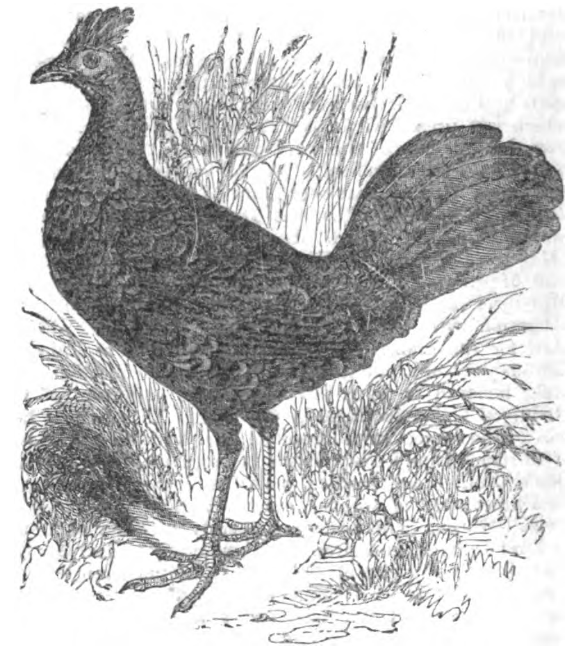
Example, *Euplocamus ignitus*.

Sir George Staunton, in his 'Embassy to China,' first made this highly interesting form known to European zoologists. His host at Batavia had, it appears, a very curious collection in the several departments of natural history. He made presents to his guests of several specimens, and among them was this beautiful pheasant, which was sent to England and described by Dr. Shaw. The tail was mutilated, for which reason the representation in the plate, No. 13 (*Atlas* to Sir George's work), was so conducted as purposely to leave the form of the tail undetermined.

Description.—Length of adult *male* about 2 feet. Skin of the nostrils stretching backwards over the sides of the head behind the eyes and bluish purple. A crest upon the crown of the head composed of naked-shafted feathers expanding at their tips into slender spreading barbs. Head, neck, breast, belly, and upper part of the back, deep chalybean or steel-blueshot black; lower part of the back fiery orange red or flame colour, varying in intensity according to the incidence of the light, and passing like a zone round the body, though more obscure on the abdomen; rump and tail-coverts broad and truncated, brilliant bluish green with a paler bar at the tip. Tail when erect folded in some degree like that of a hen; the middle feathers white, and the outside ones black with green reflections. Legs and feet vermillion, spurred.



Euplocamus ignitus (male)



Euplocamus ignitus (female).

Female, length about 20 inches. Plumage almost entirely rich cinnamon brown; feathers of the upper parts slightly mottled with black; throat white; lower parts of a paler tint than those above, and having the feathers bordered with white. Elongated head-feathers capable of being erected into a crest, but not equal to that of the male. Tail folded. Legs spurless.

Locality, Sumatra.

This is the *Fire-backed Pheasant of Java* ('Atlas' to Staunton's *Account of Lord Macartney's Embassy to China*), *The Macartney Cock* of English authors, *Phasianus ignitus* of Latham.

Gallus. (Brisson.)

Generic Character.—*Bill* moderate, strong, convex above, curved towards the point, naked at the base, and furnished with two pendant and compressed caruncles or wattles. *Head* surmounted with a fleshy crest or comb. *Tarsi* (in the male) furnished with a long and recurved spur: the hind toe only resting on the ground at its tip. *Wings* short and graduated. The fourteen tail-feathers forming two vertical planes with the backs of the feathers towards each other, and so making what may be called a folded tail; the middle feathers longest and recurved.

The ancestors from which our domestic poultry have descended were undoubtedly natives of Asia; but some doubt still hangs over the questions of the precise breed from which they came, and the exact locality where they were found. That fowls were domesticated at a very early period there is no doubt, and both historians and poets speak of the high antiquity of the race. Thus Peisthetærus relates why the cock is called Περσικὸς ὄρνις (the Persian Bird), and how it reigned over that country before Darius and Megabazus. (Aristoph., *Birds*, 483 et seq.)

To the forests and jungles of India we must look for the race in a state of nature; and though the denizens of our farm-yards may be the result of a mixture of many of the species which there inhabit, zoologists in general agree with M. Temminck in thinking that to the *Malay Gigantic Cock* or *Fowl* (*Gallus giganteus*, Temm.) and the *Bankiva Cock* (*Gallus Bankiva*, Temm.) we are chiefly if not entirely indebted for our common poultry.

The domestic cock and hen are the ἀλεκτρυών (Alectryon) and ἀλεκτορίς (Alectoris) of the Greeks; *Gallus* and *Gallina* of the antient Italians; *Gallo* and *Gallina* of the modern Italians; *Haus Hahn* and *Haus Henne* of the Germans; and *Coq* (*Gau, Geau, Gal, Gog*), *Gelline*, and *Poule* of the French.

Bold, ardent, and vigilant, the cock has been always considered the emblem of watchful courage, whilst the hen has been considered a patern of maternal solicitude. In this and other polygamous species, the object to be attained is the effective impregnation of the greatest numbers of females by the most vigorous male. In the cock accordingly the spurs are developed as the sexual organs are matured; and it is principally with these weapons of combat that the battle which is to leave the field in the possession of the strongest is decided. The conqueror in his turn, as the weakness of age comes upon him, yields to a younger and more powerful rival; and thus a numerous, healthy, and stout progeny is secured.

How the domestic cock and hen were introduced into Greece and the south of Europe is not known: upon such occasions of doubt the Phœnicians are usually resorted to; but we are ignorant of proof which can bring home the benefaction to them more than others. We find it early on the Greek and Roman coinage, and upon gems; and it figured in the public shows of those nations. It was dedicated to Apollo, to Mercury, to Æsculapius, and to Mars. Socrates, in his dying moments, reminded his disciples that he 'owed a cock to Æsculapius.' The Rhodian fowls (Martial, iii. 58, above quoted) and those from the Isle of Delos were celebrated for their superiority in fight and their delicacy for the table. The luxurious Roman had his hens fed, perhaps crammed, with meal in the dark. Thus Martial (xiii. 62, 'Gallina Altilis'):—

> 'Pascitur et dulci facilis gallina farina,
> Pascitur et tenebris: ingeniosa gula est.'

Nor was the same gastronomer ignorant of the value of the capon. (Martial, xiii. 63.)

The bird appears to have been in Britain before the invasion of Julius Cæsar, who tells us that the Britons abstained from tasting the hare, the hen, and the goose; though they bred them for their pleasure. This abstinence seems to have originated in superstitious feeling: 'Leporem et gallinam et anserem gustare fas non putant: hæc tamen alunt, animi voluptatisque causa.' (*De Bello Gallico*, lib. v.) The race is now spread all over the civilised world.

M. Lesson asks if it is not remarkable to find the domestic hen, differing in nothing from that of our countries, in all the islands of the South Sea, and among people with whom Europeans have certainly never communicated? Cocks and hens, he tells us, were very common at Oualan for example, and the natives were ignorant that these birds were good to eat. They were found among the Papuans, and among others there was a white variety with all the feathers frizzled.

We now proceed to lay before our readers a sketch of the wild breeds; and first of the *Gigantic Cock*.

This, the *Kulm Cock* of Europeans, often stands considerably more than two feet from the crown of the head to the ground. The comb extends backwards in a line with the eyes, it is thick, a little elevated, rounded upon the top, and has almost the appearance of having been cut off. The wattles of the under mandibles are comparatively small, and the throat is bare. Pale golden-reddish hackles ornament the head, neck, and upper part of the back, and some of these spring before the bare part of the throat. Middle of the back and lesser wing-coverts deep chestnut, the webs of the feathers disunited; pale reddish-yellow long drooping hackles cover the rump and base of the tail, which last is very ample and entirely of a glossy green, of which colour are the wing-coverts; the secondaries and quills are pale reddish-yellow on their outer webs. All the under parts deep glossy blackish green with high reflections; the deep chestnut of the base of the feathers appears occasionally, and gives a mottled and interrupted appearance to those parts. (Jardine principally.)

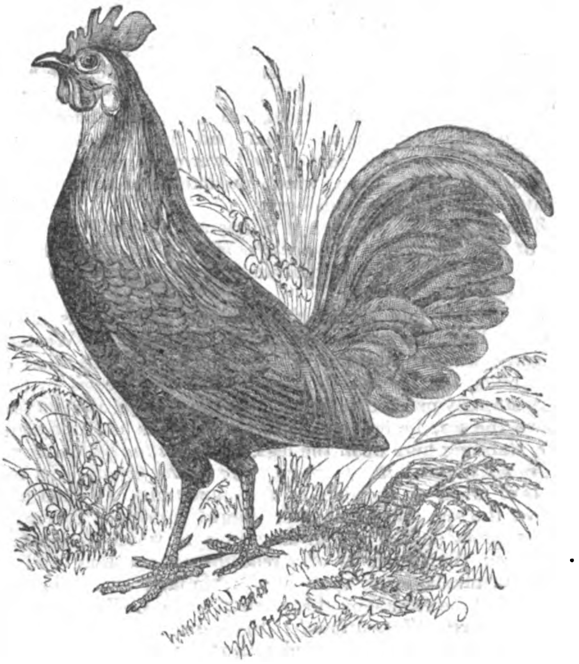
Lieut.-Col. Sykes, in his memoir on the birds found in the Dukhun (Deccan), states that it is only there met with as a domestic bird, and that he has reason to believe that it is not a native of India, but has been introduced by the Mussulmans from Sumatra or Java. The iris, he says, of the real game bird should be whitish or straw-yellow. The colonel landed two cocks and a hen in England in June, 1831; and they bore the winter well. The hen laid freely, and in September, 1832, had reared two broods of chickens. The cock had not the shrill clear pipe of the domestic bird, and his scale of notes appeared to be more limited. A cock in the colonel's possession stood 26 inches to the crown of the head, but they attain a greater height. The length from the tip of the bill to the insertion of the tail, 23 inches. Hen one-third smaller than the male. (*Zool. Proc.*, 1832.)

Bankiva Cock.

Description.—Space round the eyes and throat bare, comb much developed, deeply lobated along the upper ridge, wattles of the lower mandible rather large; long, clear, brilliant, golden orange hackles cover the head, sides of the neck, back, and rump. Upper part of the back below the hackles bluish-black, the middle and lesser wing-coverts rich deep chestnut, with the webs of the feathers disunited; greater coverts steel-blue, secondaries the same, with a broad chestnut border: quills brownish-black, edged with pale reddish-yellow. Tail black, richly glossed with green and blue. Under parts black.

This is the *Coq et Poule Bankiva* of Temminck; *Gallus Bankiva* and *Ayam utan* or *Bronga* (*Linn. Trans.*, xiii.); *Javan Cock* of Latham; and many Bantams resemble it very closely.

Sir W. Jardine states that he has seen three or four specimens of another bird very closely allied to *Gallus Bankiva*, but rather larger, and certainly distinct: they were all from the continent of India.



Gallus Bankiva.

We have also to notice the *Bronzed Cock* (*Gallus æneus*), figured by M. Temminck from a specimen sent from the interior of Sumatra by M. Diard. This is somewhat larger than the *Bankiva Cock*, and its large comb is without dentilations; indeed the edge is quite unbroken; the feathers of the head, neck, and upper part of the back are rather elongated, but not hackles. The *Fork-tailed Cock* (*Gallus furcatus*, Temm.; *Gallus Javanicus*, Horf) has the comb also entire, and the throat is adorned with a single large wattle springing from the centre. The head, neck, and upper part of the back are covered with feathers, which are not hackles, shorter and more rounded than those in the *Bronzed Cock*.

But the species which bears the name of Sonnerat is, in the judgment of that traveller, the probable stock from which our poultry are derived. The general opinion of naturalists is however adverse to that of Sonnerat; and indeed the great difference in the structure of a part of the plumage militates against it; not that it is to be concluded that the bird would not breed with our domestic hen, and produce fertile progeny; on the contrary, there is good reason for believing that such offspring would be capable of continuing the species.

Gallus Sonneratii.

Description. (*Male.*)—Size nearly equal to that of a domestic cock; but the bird is altogether lighter, more graceful, and has a higher bred look about it; comb large, and with an unequal margin, but though this margin is jagged, it is not deeply dentilated; wattles double, depending from the base of the lower mandibles; hackles of the neck and of the wing and tail-coverts dark greyish, with bright golden orange shafts dilating in the centre and towards the tip into a flat horny plate. In some of these feathers the shaft takes an elliptical or oar-like shape; in others it puts on the appearance of a long inverted cone, from the centre of the base of which a battledore-like process arises. The substance and appearance of these plates have been not inaptly compared with the wax-like plates which ornament the wings and tail of the Bohemian Chatterer. [BOMBYCILLA.] The effect produced by this modification of the shafts is singular and beautiful. Feathers of the middle of the back, breast, belly, and thighs deep rich grey, with paler shafts and edges; tail generally rich deep green; the feathers which immediately succeed the hackles are rich purple, with a pale yellow edge; those next in succession are golden-green, with grey edges, and all are glossed with brilliant metallic reflections. Bill, legs, and feet yellow. The living bird presents altogether a rich and striking object, especially when the sun shines on the plumage.

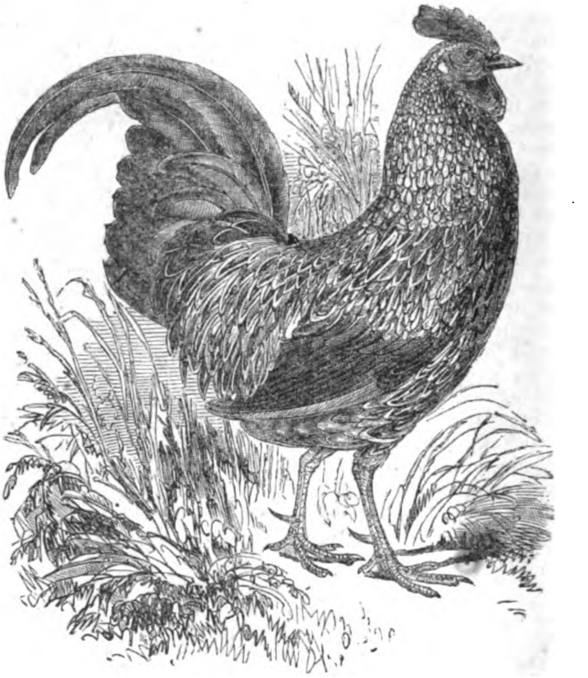
Female less than the cock by about a third, without comb or wattles, but a trace of nakedness round the eye. The plumage (generally) is without the horny structure which distinguishes that of the male. Upper parts uniform brown; neck feathers with dark edges, those of the back and wing-coverts with a pale streak along the shaft, and those of the wings, tail-coverts, and tail waved and mottled with darker pencillings; throat and front of the neck white; feathers of the rest of the lower parts greyish-white, edged with dark brown, which predominates towards the vent. Legs and feet bluish-grey

This is the *Coq sauvage* of Sonnerat; *Coq et Poule Sonnerat* of Temminck; *Sonnerat's Wild Cock* of Latham; *Rahn Komrah* of the Mahrattas; *Jungle Cock* of the English sportsmen in India.

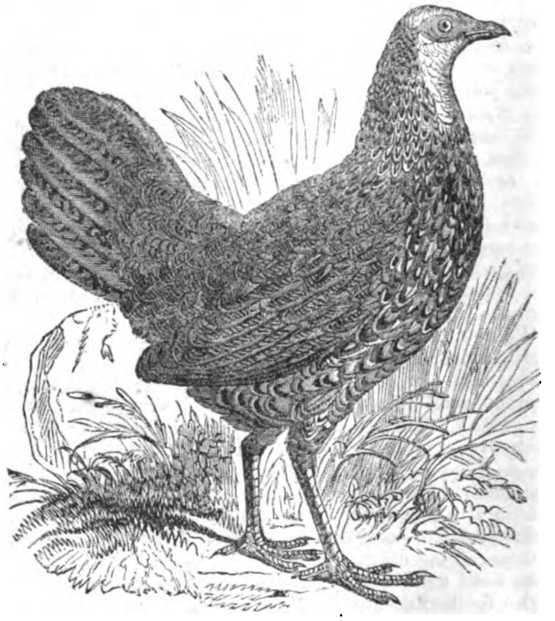
Col. Sykes, in his valuable catalogue, notes this noble bird as being very abundant in the woods of the Western Ghauts, where (and this is well worthy the attention of ornithologists) he says there are either two species or two very strongly marked varieties. In the valleys, at 2000 feet above the sea, he tells us *Sonnerat's* species is found slender, standing high upon the legs, *and with the yellow cartilaginous spots on the feathers, even in the female*. In the belts of wood on the sides of the mountains, at 4000 feet above the sea, there is a short-legged variety. The male has a great deal of red in the plumage, which *Sonnerat's* has not; the female is of a reddish-brown colour, and is without cartilaginous spots at all: 'in fact,' continues the Colonel, 'the female of this variety is the *Gallus Stanleyi* of Mr. Gray's *Illustrations*.' Eggs exactly like those of the domestic fowl in form and colour, but less in size. Col. Sykes shot a hen upon her nest, wherein there were three eggs only, in which the process of incubation had evidently been going on for some days, whence it is concluded that the wild hen sits upon a less number of eggs—*quære tamen*. In the craw and stomach of many birds Col. Sykes found nothing whatever, excepting the seeds of a stone-like hardness called *Job's tears* (*Coix barbata*). The irides are stated by Colonel Sykes to be brownish deep orange, and he says that the crow or call of this species is like that of the *Bantam Cock*. (*Zool. Proc.*, 1832.)

Dr. Latham remarks that this jungle-fowl is by far the boldest and strongest for its size, and that it is anxiously sought after by cock-fighters in Hindustan, who rely on it for victory when pitted against larger game-cocks.

Individuals of this species have been exhibited alive in the garden of the Zoological Society in the Regent's Park.'



Gallus Sonneratii (cock).



Gallus Sonneratii (hen).

But whatever may have been the source or sources from which our domestic poultry sprang, and the probability is that more than one wild race have contributed to improve it, the varieties in a reclaimed state are almost infinite. The Spanish breed, entirely black, grows to a considerable size, and the eggs are remarkable for their volume. The Dorking poultry have long been celebrated, and they are known, principally, by having supernumerary toes. The true Dorkings are purely white, and are much esteemed for the table. Dr. Latham mentions one of this breed that weighed nearly fourteen pounds. Some of the Sussex fowls are very fine.

The fancy breeds are very numerous: among them the Dutch and Polish top-knotted and pencilled breed, of two sorts, known as Gold Spangles and Silver Spangles, are much prized by some amateurs if clean-feathered, and make a very handsome appearance in the poultry-yard. Sir John Sebright brought a dwarf Bantam breed, with unfeathered legs, no top-knots, and gold-spangled and silver-spangled plumage to great perfection, as he did the breeds of most animals in which he took an interest. These clean-legged bantams were further remarkable, when true-bred, for having the tail in the cocks folded like that of a hen, and without the usual recurved drooping feathers; whence they were called hen-cocks. But though without these feathers, which are the usual indications of the common cock, no birds could possess higher courage or a more gallant carriage: we have seen one of these cocks bear himself so haughtily that the back of his head nearly touched the two almost upright feathers of his tail; and both cocks and hens without one foul feather about them. The ordinary bantams have feathered legs and the recurved sickle-like tail-feathers. Colonel Sykes remarks that the supposed species *Gallus Morio* very frequently occurs accidentally in the Dukhun (Deccan), and that, though unsightly, this fowl is very sweet eating. The periosteum of its bones is black, and the comb, wattles, and skin dull purple. *Gallus crispus*, according to Colonel Sykes, occurs accidentally in the Deccan, like the last-mentioned variety. This, generally known as the ***Friesland*** or

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Crested Cock, has all the feathers frizzled, or curled, as it were, the wrong way. It occurs also in a domesticated state in Java and Sumatra. The general colour of the plumage is white. Then there is the *Silk-fowl* (*Gallus lanatus*), which M. Temminck is inclined to consider distinct, and which comes from Japan and China. This bird is rather small in size, and the webs of the white feathers, which are silky to the sight and touch, are disunited. The comb and wattles are of a lake-purple colour. The periosteum and skin of this kind are also dark; but the flesh is very white. These silk-fowls make very good nurses, and are easily crossed with the common poultry. The *Rumpless* or *Persian Cock*, or 'Rumkin,' as it was formerly termed, is tailless. Colonel Sykes states that the *domestic fowl* (*Gallus domesticus*, Ray, *Phasianus Gallus cristatus*, Linn.) is so abundant in Deccan, that in parts of the country not much frequented by Europeans he has bought from eight to twelve full-grown fowls for two shillings. Many of the hens, particularly of the villages in the Ghauts, are not, he says, to be distinguished from the wild bird, excepting only in the want of the cartilaginous spot on the wing-coverts.

For an account of the *Hybrids*, see above (p. 60).

The common hen is subject to the assumption of the plumage of the cock, under certain circumstances, as we have already noticed above (p. 60).[*] Whilst on this point we would observe that the pea-hen noticed by John Hunter [Pavonidæ, vol. xvii.] is preserved stuffed in the Museum of the College of Surgeons, as well as the internal parts.

The proper mode of rearing poultry and hatching chickens, both naturally and by artificial heat (hotbeds, steam, &c.), together with the mode of constructing an artificial mother for the young which are so produced, and the method of ordering a poultry-yard generally, will be more properly treated of under the article Poultry, as well as the diseases to which the birds are subject. Of the gapes we have already spoken (ante, p. 59).

Tragopan. (Cuv.)

This is the genus *Ceriornis* of Swainson.

Generic Character.—Head crested on the crown, partly naked (on the cheeks and round the eyes), the naked parts terminating in horn-like caruncles behind the eyes; under the lower mandible and on the forepart of the throat a subpendent composite carunculated wattle. *Tarsi* armed with a blunt spur in the male; unarmed in the female.

Mr. Gould (*Century of Birds from the Himalaya Mountains*) remarks that the genus *Tragopan* appears to take an intermediate station between that of *Meleagris* and the more typical *Phasianidæ*, forming one of the links of a chain connecting these groups of the Rasorial order. The affinity of this genus, he observes, to that of *Meleagris*, is evident in many characters; nor are some wanting which indicate a relationship to *Numida*, and even to *Francolinus*.

Tragopan Satyrus appears to have been the only species originally known. Mr. Gould, in his 'Century,' describes another species, *Tragopan Hastingsii*, and refers to another, which Mr. Gray, of the British Museum, has dedicated to M. Temminck. (*Indian Zoology*.)

Example, *Tragopan Hastingsii*.

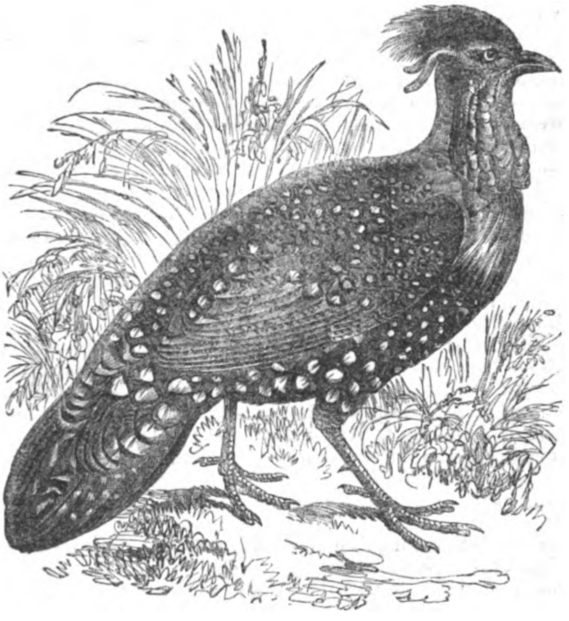
Description.—Head of the *adult male* covered with a pendent crest of feathers, which, as well as the ear-coverts and throat, are black; the neck and shoulders are rich maroon; the chest rich glossy orange red; the naked skin around the eyes is red; the fleshy horns and wattles mingled blue and purple; the upper parts exhibit a mixture of zigzag lines and marks of dark and light brown, with numerous and distinct spots of white; each of the upper tail-coverts ends in a large white eye, bordered on the sides with brown, and tipped with black; the tail deepens till it ends in uniform black; the feathers of the under surface are maroon, largely tipped with black, in the centre of which is a large white spot; the beak is black, the tarsi brown.

In the *young male* the plumage is much less brilliant, the wattles being of a pale flesh-colour, and little developed, as is also the naked skin of the face.

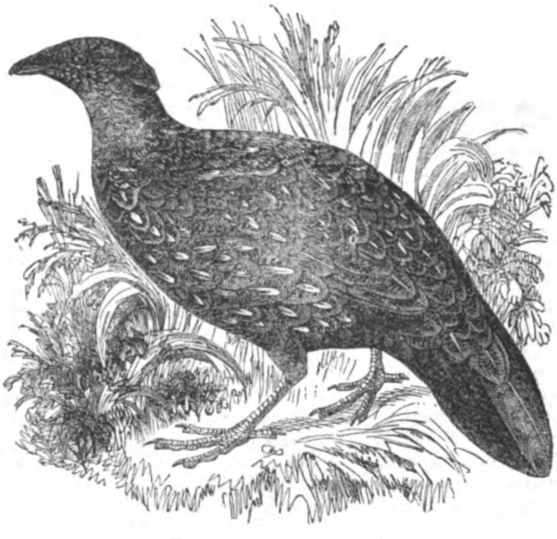
The plumage of the *female* consists of a uniform brown, mottled and barred with mingled lines and dots of various tints, the feathers of the back and chest having a central dash of a lighter colour; the head is crested, with short rounded feathers; the sides of the cheeks are clothed, and there are neither fleshy horns nor wattles. (Gould.)

Mr. Gould observes, that although this species and *T. Satyrus* are closely allied to each other, and doubtless possess similar habits and manners, he is led to believe that their local distribution is somewhat different; at least, he generally receives but one species in a collection from the same quarter; *Tragopan Satyrus* being transmitted from the Nepaulese Hills, while *T. Hastingsii* is sent from the more northern range of the Himalaya. He further well observes that the changes of plumage which birds of this genus, especially *T. Hastingsii*, undergo in passing from youth to maturity (and this is well illustrated in Mr. Gould's beautiful plates), are such as to have caused an apparently erroneous multiplication of species.

Tragopan Satyrus, according to the same author, is an exclusive inhabitant of the colder regions of the mountains, in conjunction with the *Lophophorus*, its proximate relative, feeding on grains and roots, the larvæ of ants, and other insects. [Pavonidæ.]



Tragopan Hastingsii (male).



Tragopan Hastingsii (female).

In conclusion we have to call the reader's attention to the beautiful *Phasianus Staceii* (figured and described by Mr. Gould in his 'Century') as one of the true pheasants; and to *Phasianus Pucrasia* and *Phasianus albo-cristatus*, also there figured. *Phas. Pucrasia* appears to us to lead the way from the true pheasants to the *Lophophori*; and *Ph. albo-cristatus* to be an *Euplocamus*, which, even more immediately than *Euplocamus ignitus*, forms a transition from the genus *Phasianus* to the genus *Gallus*.

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[*] See also Dr. Butter's paper, 'Memoirs of the Wernerian Society,' vol. iii.

We cannot forbear to add that the *Argus Pheasant* [PAVONIDÆ, vol. xvii., p. 338, et seq.] has been brought alive to this country by that indefatigable collector Hugh Cuming, Esq. It was obtained from Malacca, and is now (June 11, 1840) in good health at the garden of the Zoological Society of London in the Regent's Park. We are not aware of any other instance of a living specimen of this noble bird having been brought home.

PHEIDON, the supreme ruler of Argos, lived in the eighth century before the Christian æra. The Parian marble (No. 31), and several antient writers make him contemporary with Iphitus and Lycurgus; but the statement of Pausanias (vi. 22, § 2), that he celebrated the eighth Olympic games, places him in B.C. 748, which date is also supported by the testimony of Ephorus (apud Strab., viii., p. 358), that he was in the tenth generation from Temenus. Pheidon is usually called tyrant of Argos, but he was in fact the hereditary king. He appears to have obtained the name of tyrant on account of having made himself absolute. (Aristot., *Rep.*, v. 8, § 4.) Pheidon was an active and enterprising prince; and while Sparta was weakened by her wars with the Messenians, he greatly extended the dominions of Argos, and appears to have acquired possession of the whole eastern coast of Laconica as far as Cape Malea, and of the island of Cythera, which, as we learn from Herodotus (i. 82), once belonged to Argos. He attacked the towns which were said to have been taken by Hercules, and claimed the right of presiding over all the festivals which Hercules had instituted. On this ground he deprived the Eleans of their presidency of the Olympic games, which he presided over in conjunction with the Pisæans. (Strabo, viii. 358; Paus., vi. 22, § 2.) But his usurpation united the Eleans and Lacedæmonians against him, and thus led to his overthrow.

Pheidon is said to have invented weights and measures, which bore his name (Strabo, viii. 376; Plin., *Hist. Nat.*, vii. 56; Pollux, x. 179), and is also stated by most antient writers to have been the first person to coin silver money, though, according to Herodotus (i. 94), the Lydians were the first people who put a stamp upon gold and silver.

(Clinton, *Fasti Hellenici*, vol. i., appendix 1; Müller, *Æginetica*, p. 51-63; *Dorians*, vol. i., p. 177-180, translation.)

PHE'NE, Savigny's generic name for the *Lämmergeyer* (*Gypaëtus barbatus* of Storr). Savigny's name is a restoration from Aristotle and the Greek writers on natural history; but the form is known to zoologists under the title attached to it by Ray, viz. *Gypaëtus*. [VULTURIDÆ.]

PHERE'CRATES (Φερεκράτης), a writer of the old comedy, was contemporary with Plato, Aristophanes, Phrynichus, and Eupolis. (Suidas, *Plato.*) His play, called the 'Countrymen' (Ἄγριοι), was represented B.C. 420. (Athen., v., p. 218, d; Plato, *Protag.*, c. 47, p. 327 d.) He wrote seventeen comedies (Suidas, *Pherecrates*), of which a few fragments remain, which have been published, together with those of Eupolis, by Runkel, Leip., 1829. Pherecrates is only mentioned once by Aristophanes (*Lysist.*, 158). He invented a particular kind of metre, which has been called from him the Pherecratic.

PHERECY'DES (Φερεκύδης). There were two Greek writers of this name, the philosopher and the historian, who are frequently confounded, as in Lucian, *Macrob.*, c. 22; Clem., *Strom.*, v., p. 567, c.; Euseb., *Chron. ad Olymp.*, 59, 4.

PHERECYDES, the philosopher, was a native of Syros. His father's name was Babis, and he was born, according to Suidas (*Pherecydes*), in the 45th Olympiad, that is, about B.C. 600. Diogenes Laertius informs us (i. 121) that he flourished in the 59th Olympiad, that is, about B.C. 544; which date agrees with the account of Cicero, who says (*Tusc.*, i. 16) that he was contemporary with Servius Tullius. He is said by some writers to have obtained his knowledge from the sacred books of the Phœnicians or from Egypt, and by others to have been a disciple of Pittacus. (Diog. Laert., i. 116.) He taught Pythagoras (Suidas; Cic., *Tusc.*, i. 16; *De Div.*, i. 50), and appears to have had a considerable acquaintance with natural science. (Diog. Laert., i. 116.) He is said by Cicero (*Tusc.*, i. 16) to have taught the immortality of the soul. According to Suidas, one of his works was entitled 'Ἑπτάμυχος, or the 'Seven Secrets,' and another Θεολογία, which gave an account of the generation and succession of the gods. Theopompus says (apud Diog. Laert., i. 116) that Pherecydes was the first among the Greeks who wrote on the nature of the gods.

There are no particulars of the life of Pherecydes worth recording. His death is variously related: some writers say that he died in the territory of Magnesia in Asia Minor; some, that he threw himself down from the Corycian rock above Delphi; and others, that he died in Delos.

PHERECYDES, the historian, was contemporary with Herodotus, and flourished betweeen B.C. 480 and 456. Suidas mentions two historians of this name, and says that one was born at Athens and the other at Leros; but Vossius (*De Hist. Gr.*, iv. 4) has shown that they are the same person. It appears probable that Pherecydes was born at Leros, and afterwards settled at Athens, whence the mistake of Suidas arose. The work of Pherecydes, which is often quoted by the Scholiasts and by Apollodorus, was a mythological history in ten or twelve books; but it also included events subsequent to the mythological period, as the Scythian invasion of Darius (Clem., *Strom.*, v., p. 567, c.), and the Ionic migration led by the sons of Cadmus (Strabo, xiv., p. 632). Compare Clinton's *Fast. Hell.*, vol. ii., p. 372.

The fragments of Pherecydes have been published by Sturz under the title of 'Pherecydis Fragmenta, e variis scriptoribus collegit, emendavit, commentationem de Pherecyde utroque, et historico et philosopho præmisit, &c.,' Gerae, 1787; 2nd edition, Lip., 1824.

PHERU'SA, Dr. Leach's name for a genus of the Amphipodous order of *Edriophthalmian Crustaceans*. [EDRIOPHTHALMA.]

The genus *Amphithöe*, which generally precedes *Pherusa* in the systems, has the four anterior feet nearly identical in both sexes, and their penultimate joint, or hand, is ovoïd · in *Pherusa* the hand is filiform.

Example, *Pherusa fucicola*.

Description.—Yellowish ash-colour, or grey-ash varied with red.

Locality.—Coasts of England, where it is rare, and found among the sea-weed.

PHERUSA, a Lamarckian genus of Zoophyta. [POLYPIARIA MEMBRANACEA.]

PHIAL, LEYDEN. [ELECTRICITY.]

PHIBALU'RA, M. Vieillot's name for a genus of *Ampelidæ* (*Fruit-eaters* or *Chatterers*), placed both by Mr Swainson and Mr. G. R. Gray in the subfamily of *Bombycillinæ*, the *Swallow-Chatterers* of the former zoologist. The genera included by both in the subfamily are the same; Mr. Swainson's genera being *Phibalura*, *Bombycilla* [BOMBYCILLA], and *Procnias*, and those of Mr. Gray *Phibalura*, *Bombycilla*, and *Tersa*, Vieill., the latter being the *Procnias* of Illiger and others.

Generic Character.—*Bill* remarkably short, but rather strong; culmen arched; *Nostrils* concealed; *Gape* enormous; the sides smooth. *Feet* pale; anterior scales transverse; lateral scales minute, reticulate. Tail lengthened, deeply forked. (Sw.)

Example, *Phibalura cristata*.

Description.—Total length 9 inches, of which the tail occupies 4½ inches. Bill whitish and remarkably short, measuring only 3 lines from the nostrils to the tip, but three-quarters of an inch from the angle of the mouth, which opens just under the eye. Plumage singularly variegated. Crown of the head furnished with a crest, which, when not elevated, is scarcely seen, and appears a deep glossy black mixed with grey and rufous; but, when erected, is very conspicuous, all the feathers being bright rufous, tipped more or less with black; upper sides of the head grey, the lower part and ears deep black; the neck above greyish white, with blackish transverse lines: the back, scapulars, rump, and tail-covers varied transversely with olive, shining black, and bright yellow, each feather olive at the base, black in the middle, and yellow at the tip. Beneath, the feathers of the chin and part of the throat are somewhat lengthened, semi-setaceous, and of a bright yellow; the neck and breast white, with two transverse lines of deep black on each feather; these lines diminish, and are broken into spots on the body, and nearly disappear on the vent: the edges of the feathers are tipped with yellow, and this colour increases downwards on the vent and tail-covers, which latter are entirely yellow. The wings, 4 inches long, are uniform deep black, with a blue gloss, much pointed, and calculated for rapid flight. Tail the same colour, the exterior basal margins olive; all the feathers narrow, pointed, and gradually lengthening; the feet pale yellow, and three-quarters of an inch from the knee to the claws, the three foremost of which are equally connected together (though slightly) nearly as far as the first joint; outer and inner toes equal, and rather shorter than the hind-toe; claws slender and much compressed. (Sw.)

Observations.—Nostrils not covered by a membrane, open obliquely and ovately round, with a narrow rim round the margin: first and third quills of equal length, and shorter than the second, which is longest. (Sw.)

Locality.—South America. A beautiful figure accompanies Mr. Swainson's description in the *Zoological Illustrations*, first series.

PHI'DIAS, one of the most celebrated artists of antiquity, was a native of Athens. His father's name was Charmidas. The exact time of his birth is not known, but, as far as can be judged from the ascertained dates of some of his works, it seems to be generally admitted that it must have occurred between the seventieth and seventy-third Olympiads, that is, from 490 to 480 B.C. It is said that in early life Phidias practised painting, but there is no authority for his having followed it as a profession, and if he ever practised it, as it is probable he did, from some of his family being painters, he doubtless soon relinquished it for the sister art of sculpture, in which he afterwards became so eminent. Phidias, according to antient writers, had two masters, Hippias, and Eladas, Geladas, or Ageladas. Hippias is mentioned only by one author (Dion. Chrysostom., *Orat.*, lv.), and the modern writers on the life of Phidias seem disposed to reject that testimony. (Emeric David, Müller, Sillig, and others.) Ageladas was one of the most distinguished artists of the age. He was a native of Argos.

The times in which Phidias lived were peculiarly favourable to the development of his genius and talents, and his ability must have been shown at a very early age, as it appears he was extensively employed upon great public works, even during the administration of Cimon. Afterwards, when Pericles attained the supreme power in Athens, Phidias seems to have been consulted on all occasions in which the embellishment of the city, either by magnificent buildings or by sculptured decorations, was contemplated. 'It was Phidias,' says Plutarch (*Pericles*), 'who had the direction of these works, although great architects and skilful artificers were employed in erecting them.' Among the more remarkable objects upon which his talents were at this time exercised, the temple of Minerva, called the Parthenon, justly claims pre-eminence. No pains and no expense were spared to make this one of the most splendid and perfect monuments of art; and, fortunately, enough exists in the present day, both of its architecture and sculptural decorations, to confirm the high encomiums passed upon it by those who saw it in its perfection. The temple itself was constructed of marble. The architects employed upon it, under the direction and superintendence of Phidias, were Callicrates and Ictinus; but the statue of the goddess within the temple was the work of Phidias himself, and, with the exception of the statue of the Olympian Jupiter, which he made at Elis, was the most celebrated of his performances. Minerva was represented standing. In one hand she held a spear; in the other a statue of Victory. Her helmet, highly decorated, was surmounted by a sphinx. The naked parts of the figure were made of ivory. The eyes were of precious stones, and the drapery throughout was of gold—of which metal, it is said, no less than forty talents' weight was used. We are told that by the advice of Pericles, Phidias so arranged the drapery that it could at any time be removed without injury. This seems to have been suggested by the feeling that the Athenians might possibly desire to ascertain whether the gold was fairly appropriated; and subsequent events proved the wisdom of the counsel. The people, desiring to have all the glory of this work, had a decree passed prohibiting Phidias from inscribing his name on the statue, but he contrived to introduce his own portrait (as an old bald-headed man, hurling a stone) in the representation of the combat of the Athenians and Amazons which decorated the shield. A likeness of Pericles was also introduced in the same composition. The exterior of this temple was likewise enriched with sculpture; the two pediments, the metopes, and the frieze being filled with statues and rilievi, many of them from the hand and all of them executed under the direction of Phidias. Part of these (known now as the Elgin Marbles, from their having been brought to this country by the earl of Elgin) form a portion of our collection of sculpture in the British Museum. [BASSO RILIEVO; ELGIN MARBLES.] Of their merits it is enough to say that the most eminent judges of modern times have added their testimony to that of the antients by bestowing on them the highest commendation. (Quatremère de Quincy, *Lettres de Londres à Canova; Mémoire sur les Ouvrages de Sculpture qui appartenaient au Parthénon*, &c., par M. Visconti; *Report of Select Committee of the House of Commons*, 1815, in which the opinions of West, Lawrence, Flaxman, and Westmacott will be found well worthy the attention of the student and amateur; Müller, *De Parthenonis Fastigio;* and others.) The eminent sculptor Canova, after visiting London, declared, 'that he should have been well repaid for his journey to England had he seen nothing but the Elgin Marbles.'

The enemies of Pericles, with the view of implicating him also in the charge, accused Phidias of having misapplied part of the gold entrusted to him for the statue of Minerva, and desired that he should be brought to trial. The prudent foresight of Pericles saved both Phidias and himself. He immediately ordered the gold to be taken off and weighed before the people. This however was not done, and the accusation of embezzlement fell to the ground. They then declared the sculptor was guilty of sacrilege in having placed his own portrait on the shield of Minerva. Some accounts say he was thrown into prison, and there died by poison; others, that he was banished. Some affirm there was no sentence passed, but that, fearing the consequences of this charge, the sculptor fled from Athens and took refuge in Elis, and that he was employed there to execute a costly statue of the Olympian Jupiter, to be erected in his temple in Altis. This statue was the most renowned of the works of Phidias. It was of colossal dimensions, and was what the antients called *chryselephantine;* that is, composed of gold and ivory. The god was represented seated on his throne. His brows were crowned with a wreath of olive, and he held in his hand a statue of Victory. The accessories and enrichments of the throne, footstool, and pedestal, which were of the highest quality of art, are described by Pausanias (v., 11, 14, 15), Strabo (viii., p. 353. Casaub.), and other antient writers; and in the highly valuable work, by M. Quatremère de Quincy, 'Sur le Jupiter Olympien.'

A tradition connected with this statue is interesting from its exhibiting the importance which the Greeks attached to works of art of high character and merit. Phidias, after the completion of his design, is said to have prayed Jupiter to favour him with some intimation of the divine approbation. A flash of lightning immediately darted into the temple and struck the pavement before him. This was hailed as a proof of the favour of the god, and in commemoration of the event a brazen urn or vase was placed on the spot. Pausanias (v. 11) says that this existed in his time. It is pretended that Phidias was again accused of robbery by the people of Elis, and that he died in prison. There are however strong reasons for thinking that these accusations against Phidias not only are false, but that the accounts of his death and disgrace are not founded on fact. The scholar will find much that is interesting on this subject in some of the works before referred to. To these we would add O. C. Müller, *De Vitâ Phidiæ;* an Essay by Emeric David, entitled *Examen des Inculpations dirigées contre Phidias*, 1817; also an article, by the same, in the *Biographie Universelle* ('Phidias'); in Junius, *Catalogus Artificum*, and in the work of Sillig with the same title. There can be little doubt, from an expression in Aristophanes ('Peace,' 605, etc.), that an *unjust feeling* had been excited against Phidias, though it is not clear whether he fled or was exiled; and it seems highly probable that he died at Elis. Müller, on the other hand, supposes that Phidias executed the Minerva of the Parthenon, and was then *invited* by the people of of Elis to execute for them the statue of Jupiter; that he returned to Athens, and was, after a time, accused by the enemies of Pericles, who threw him into prison, where he died in the 87th Olympiad. The scholiast on Aristophanes ('Peace,' 604) says he died at Elis; it is also said that he was put to death by the people of Elis, but for what reason is not stated, though some say it was to prevent his ever producing a work that should eclipse their statue. An honour which was paid to his memory would go far to disprove the assertion that he suffered the death of a criminal. The care of his master-piece, the statue of the Olympian Jupiter, was entrusted to his family under the title of *Phaidruntai*. His study or workshop near the temple was also preserved with great respect, and in the middle of it an altar was raised, consecrated to all the gods. Pausanias (v. 14) tells us that the Phaidruntai, descendants of Phidias, existed in his time—six hundred years after the erection of the statue of Jupiter.

Phidias has been called the 'sculptor of the gods' (Quintilian, xii. 10) from the grand and sublime character which he threw into his productions. Reference has already been made to his two greatest works, the Minerva of the Parthenon, and the Jupiter at Elis. He also executed much admired statues, some in marble, but chiefly in bronze, of Venus, Apollo, Mercury, an Amazon, &c., &c. (See Pausanias, *passim;* Plin., *Hist. Nat.*, xxxvi.; Lucian, *De Imag.*) His statues of Minerva were numerous: no less than eight or nine are recorded. One of these, the Minerva Areia of the Platæans, was of wood, gilt; with the exception of the extremities, which were made of the marble of Pentelicus. Although Phidias exercised his skill as a sculptor in all the materials which were in general use for the purposes of art, gold, ivory, bronze, marble, and even wood, yet his productions in a mixture of the two former (*chryselephantine* sculpture) appear to have been the most highly esteemed, both from the extensive scale upon which he used such rich materials, and from the great importance of the works to which they were applied. This is a branch of what the antients called *toreutic* art, which seems to mean the union of metal with any other material.

Phidias brought to perfection the grand or sublime style of sculpture. The artists before him are represented as having a hard, stiff, dry manner. Phidias improved upon this by making a more careful selection and use of the finest models in nature. After Phidias a softer style was introduced, in which Praxiteles, and after him Lysippus, were eminent. The age of Phidias is justly considered the grand and golden age of sculpture.

PHIGALIA (*Φιγαλία*), a town of Arcadia, the site of which is supposed now to be occupied by the modern town of Paulizza. Nothing certain is known respecting its foundation.

Phigalia was attacked by the Spartans, and abandoned by its inhabitants, in the second year of the thirtieth Olympiad (659 B.C.), when Miltiades was archon of Athens. The Phigalians consulted the oracle at Delphi, and the Pythia declared that they could only recover possession of their city with the assistance of a chosen band of one hundred Oresthasians, who should all perish in the battle. The prediction was fulfilled. One hundred Oresthasians willingly devoted themselves, and the Phigalians were re-established. Their heroic deliverers were buried in the forum, and funeral games were celebrated annually in their honour. (Pausanias, viii. 39-41.)

PHIGALIAN MARBLES, a series of sculptures in alto-rilievo, preserved in the British Museum, which are so called from having been discovered among the ruins of a temple at the antient Bassæ on Mount Cotylion, not far from the site of Phigalia. The subjects represented in them are the battle of the Centaurs and Lapithæ, which occupies eleven slabs, and that of the Greeks and Amazons, in twelve slabs. The height of each is two feet one inch, and the whole length about 100 feet. These rilievi formed a frieze round the interior of the cella, and were elevated about 22 feet from the ground.

Pausanias (viii. 41), describing the edifice from which these marbles were brought, says, 'After that at Tegea, it may be considered the most beautiful of all the temples of the Peloponnesus.' The roof of the building was of stone. It was dedicated to Apollo Epicurius (or the *Deliverer*), a title conferred upon him because he had delivered the Phigalians from a pestilence.

These sculptures are of various degrees of merit as regards execution; but the composition, expression, and style of art prove that they came from a fine school of design. The evidence of this in the works themselves is confirmed by the history, which has fortunately reached our times, of the temple which they decorated. The name of the architect was Ictinus, the same who, when Phidias was appointed to superintend the various public works carried on at Athens during the administration of Pericles, was associated with Callicrates to erect the temple of Minerva, or the Parthenon; one of the most splendid monuments of the golden age of art. This gives us the proximate date of the execution of the sculptures under consideration. The Parthenon was finished about 437 B.C. The temple of Apollo at Bassæ may therefore be attributed to about the same period.

The quality of the design of these rilievi warrants the assumption that the eminent sculptor who directed the decoration of the former great work of Ictinus may have contributed the advantage of his skill by suggesting the fine compositions of the sculptures for his present undertaking. It is not difficult to discern in them the same sentiment and character which pervade the marbles of the Parthenon. This correspondence is particularly observable in comparing portions of the Phigalian frieze with the metopes of that building: see *figs.* 1 and 2 (Phigalian Marbles), and *figs.* 6 and 7 (Metopes of the Parthenon), where the same subject,

Fig. 1.

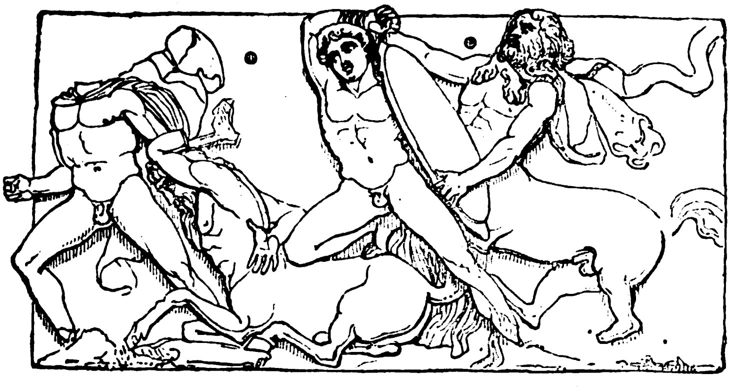


Fig. 2.

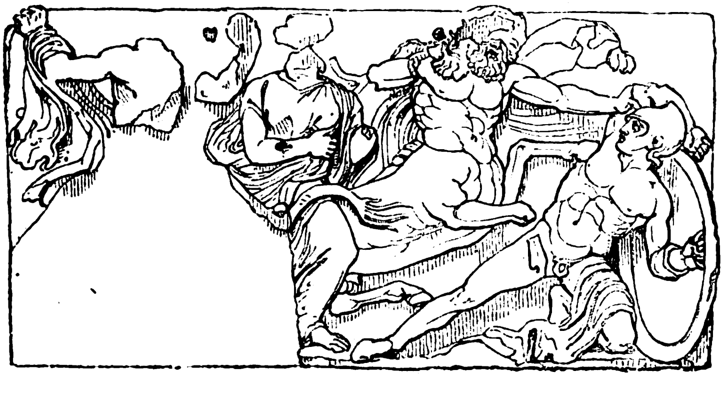


Fig. 3.

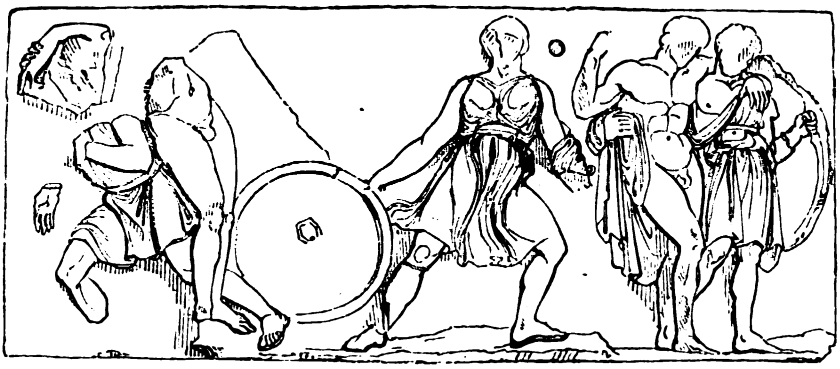


Fig. 4.

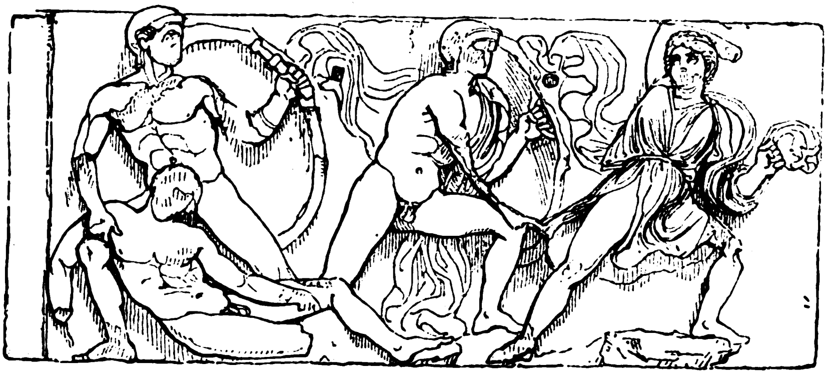


Fig. 5.

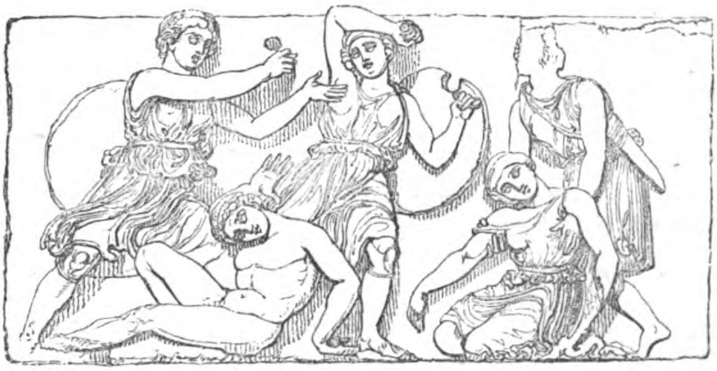


Fig. 6.

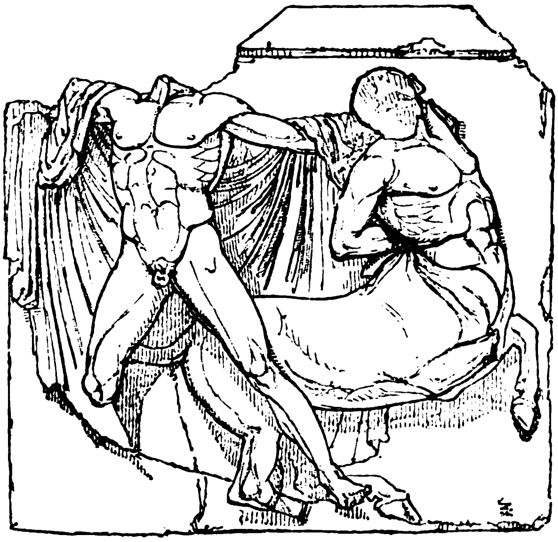
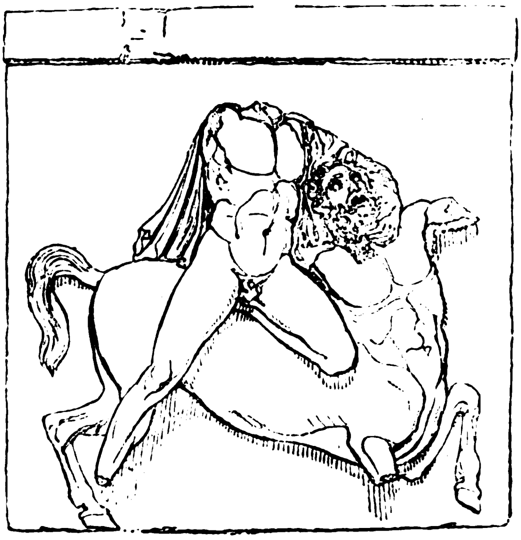


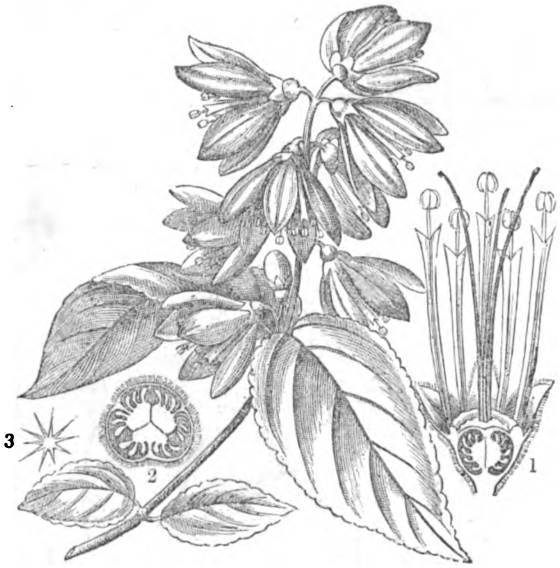
Fig. 7.



the battle of the Centaurs and Lapithæ, is represented. The same may be remarked with respect to other parts of this fine series, whether it be considered for the energy displayed in violent action (*figs.* 1, 2, and 4), for grace and tenderness where gentler expression is to be conveyed (*figs.* 3 and 5), for playful flow of lines (as in groups in *figs.* 3 and 4), or for the just balancing of parts as the means of producing an harmonious whole. Throughout there is the stamp of careful thought, and evidence of an intimate knowledge of art, combined with a free and bold style. Among the excellencies of *treatment*, as it is technically called, the value and quality of flesh and drapery, in contrast, are finely exhibited in parts of *figs*. 3 and 4. The few specimens here chosen for illustration are sufficient to show the claim these marbles have to our admiration as compositions. The difference alluded to in the merit of the execution may probably be owing to the working out of the general design having been entrusted either to pupils or to various and inferior artists, the idea and the compositions alone being furnished by the master-mind.

These interesting specimens of Greek sculpture were discovered in the year 1812. They were purchased for the British Museum in 1814, and arrived in England in the following year. The slabs were found, with two or three exceptions, lying on the floor or pavement of the temple, under the identical places they had originally occupied. They were much mutilated, both from the injury they had sustained from their own weight in falling, and from the heavy masses of the building which had fallen on them. They have been put together with great care, the pieces being secured by copper bolts; but in no instance has their integrity been impaired by restorations. For detailed descriptions of these marbles, the reader is referred to the elaborate work of Baron von Stackelberg, 'Der Apollotempel zu Bassæ in Arcadien,' &c., Rome, 1826; also to Part IV. of 'Description of the Antient Marbles in the British Museum;' and to the 'Elgin Marbles,' published under the superintendence of the Society for the Diffusion of Useful Knowledge.

PHILADELPHA'CEÆ form a small natural order of exogenous polypetalous plants, with an inferior ovary, the principal genus being that after which the order is named. [PHILADELPHUS.] The species are American, European, and Asiatic shrubs of temperate climates, with opposite leaves, distinct styles, and capsular fruit, containing a large number of minute seeds. Their nearest affinity is, on the one hand, with Myrtaceæ, from which they differ in having separate styles, dotless leaves, and albuminous seeds, and on the other with Saxifragaceæ, from which their strictly inferior fruit, opposite leaves, and parallel styles sufficiently distinguish them. Many of the species, especially in the genus Deutzia, are clothed with beautiful stellate hairs, which form excellent opaque objects for examination with the microscope.



Deutzia scabra.

1, a vertical section of a flower deprived of petals; 2, a transverse section of the ovary; 3, one of the stellate hairs.

PHILADE'LPHIA, formerly the capital of the state of Pennsylvania, in the United States of North America, is situated in the county of Philadelphia, in 39° 57′ N. lat. and 75° 10′ W. long. With the exception of New York, it is the largest city in the United States. The population in 1810 was 96,664; in 1820, 119,325; in 1830, 167,811; and may therefore be now (1840) estimated at upwards of 200,000.

Philadelphia is about 120 miles from the Atlantic, following the course of the Delaware, and about 55 miles from it in a straight line. It lies immediately above the junction of the Schuylkill with the Delaware, and occupies the space, about two miles in width, between the two rivers. The city is about four miles in length; the streets which run north and south, parallel with the rivers, are called First Street, Second Street, and so on, except Broad Street and Schuylkill Street. These streets are crossed at right angles by others which run from east to west, and which are almost all named after trees, as Chestnut Street, Walnut Street, &c. The squares thus formed are subdivided by other streets still smaller and by alleys. The streets are paved with stones; the foot-pavements are of brick, defended by curb-stones. Most of the principal streets have rows of locust and other trees, which afford a delightful shade in the summer. The houses are generally of brick, but many of them have the outer steps and also the window-sills of white marble. The streets, steps, and windows are kept extremely clean, and the whole city has an air of peculiar neatness. Under the main streets there are sewers, which empty themselves into the Delaware. The city is lighted with gas. There are a few squares. Independence Square is about 270 yards each side. Washington Square is the largest in the city, and is a fashionable promenade.

Of the public buildings of Philadelphia, the old State House is one of the most interesting, though one of the plainest. It is of brick, still of the pristine colour. The Declaration of Independence was read from the steps in front of the building, on the 4th of July, 1776. The District Court for the city and county of Philadelphia is held in the State House.

The United States' Mint was established at Philadelphia by an act of Congress passed April 2, 1792, where it has ever since been continued. It is the only place in the United States where coin is struck. A new building was commenced in 1829 on a large scale. The order is Ionic. It has a front of 122 feet, faced with marble, and consists of a portico of 62 feet, and two wings of 30 feet each.

The Bank of the United States is a splendid edifice, entirely of white marble. The portico is copied from the Parthenon at Athens. The Pennsylvania Bank and that of the late Mr. Girard are much smaller, but the fronts of both are of white marble, and they have a very neat appearance.

The Pennsylvania Hospital was instituted in 1751 by voluntary subscriptions, and opened to the public in 1752; from that year till 1832, as many as 29,616 patients were admitted, of whom 15,293 were paupers; 18,400 were restored to health, and 3188 died in the hospital. The number of lunatics admitted during the same period of eighty years was 3718, of whom 1289 were cured, and 530 died in the hospital. It is calculated that about 1400 patients are admitted annually, of whom three-fourths are paupers, and a large number insane. The mode of treatment of the insane patients is one of uniform mildness, and the most beneficial effects have been found to result from it. The hospital has a library of 7000 volumes. The buildings occupy an entire square, in the middle of which is a a bronze statue of William Penn in the dress he used to wear, the square-cut coat, long waistcoat, and cocked hat.

The House of Refuge occupies a plot of ground 400 feet in length by 230 feet in breadth, enclosed by a stone wall 20 feet high. The main building is 92 feet long by 30 feet deep. It receives all destitute males under 21 and all females under 19. It is a school for the reformation of character, which has been productive of great benefit. About 280 can be accommodated.

The Deaf and Dumb Asylum is built of granite. It is 96½ feet long by 63 feet deep. [DEAF AND DUMB, p. 336.]

The Public Almshouse, with an Infirmary attached to it, is a large pile of building, capable of containing 1600 patients. The average number of patients is about 1000. There are many lunatics in one of the wards, who are treated in the same mild manner as at the House of Refuge.

There are several other benevolent institutions, among which the most important are—the Marine Asylum, which has a front of 386 feet, consisting of a portico of 90 feet and two wings of 148 feet each; the Widows' Asylum; the Orphans' Institution; the Magdalen Institution; the Asylum for the Blind; and the Sunday-school Association. There are also a great number of Benefit Societies, for the support of the members in sickness, who contribute a small sum weekly or monthly.

There are upwards of a hundred places of public worship in Philadelphia, but none of them are distinguished either for architecture or size. In 1833 there were 9 Protestant Episcopal churches, 4 Roman Catholic, 19 Presbyterian, 1 Scotch Presbyterian, 10 Methodist, 3 Reformed Dutch, 6 Baptist, 5 German Lutheran, 6 Quakers, 1 Free Quakers, 1 Covenanters, 2 German Reformed, 2 Universalists, 2 Synagogues, 1 Bible Christian, 1 Mariners, 1 Swedenborgian, 10 Unitarians, 1 Moravian, 1 Menonist, 1 Swedish Lutheran, 1 Mount Zion.

In literary institutions Philadelphia ranks perhaps higher than any other city in the United States. The Philadelphia Library was commenced by Franklin in 1731. The building, which is rather handsome, was erected in 1790. A marble statue of Franklin, executed in Italy, is placed over the front door. The library contains 45,000 volumes. The American Philosophical Society reckons among its members distinguished literary men in all parts of the world. The library contains upwards of 10,000 volumes of scientific works. The American Historical Society has also a high reputation. The Academy of Natural Sciences possesses a library consisting of upwards of 6000 volumes. The Philadelphia Athenæum, established in 1814, has a library of about 6000 volumes, and a reading-room in which 70 or 80 newspapers of the United States, as well as English, French, and other foreign journals, may be seen. Peale's Museum has an excellent collection of stuffed quadrupeds and birds, and possesses the most perfect specimen of a mastodon in the world; it is nearly complete, and so large that the skeleton of an elephant placed by its side appears small. [MASTODON, p. 5.]

The University of Pennsylvania is distinguished for its medical school. The new halls, built in 1830, are spacious and handsome. The Jefferson Medical College has also a spacious hall. The Pennsylvania Academy of Fine Arts has a handsome rotunda with a dome. There are several galleries of paintings and statues, which include sculptures by Canova and Chantrev, as well as pictures by the best masters.

The first newspaper published in Philadelphia, entitled 'The American Weekly Mercury,' was printed on a half sheet of pot paper, bearing date December 22, 1719. The second newspaper was commenced in 1728; its title was 'The Universal Instructor in all the Arts and Sciences, and Pennsylvania Gazette.' Before the end of the first year it fell into the hands of Franklin, who was long connected with it as joint or sole proprietor. This paper, under the abridged title of 'The Pennsylvania Gazette,' was continued till within the last fifteen years, having been for a considerable time the oldest newspaper in the United States. There were eight daily newspapers published in Philadelphia, as early as 1807, and we believe the same number still continues. The weekly newspapers vary from 15 to 20. There are 8 or 10 monthly publications, and 4 quarterly.

There are three theatres in Philadelphia; the one in Arch Street is a handsome building, with the front and columns of white marble.

The markets are admirable, particularly one long range in High Street, which is a pattern of perfect cleanliness and neatness.

There are four prisons. The system of solitary confinement was commenced in the Eastern Penitentiary, a building with lofty castellated walls and towers, loop-holed windows, portcullis, and ponderous iron-studded gates; but a new prison has been built which is more suitable for the purpose. The centre is a rotunda, which is used as a watch-room. From this run long passages so contrived that, by means of echoes, every sound may be heard from the most distant part; the cells are on each side of these passages, and are so separated that communication between the inmates is impossible. Each cell is eight feet wide, twelve feet long, and sixteen feet high. Outside the cell is a yard eight feet wide and twenty feet long, surrounded by a high wall, where the prisoner is permitted to walk. From the passages, through small openings, everything that is passing in the cells may be seen. The prisoners are kept employed, but are never permitted to leave the cell or yard till the term of imprisonment has expired, which may continue for years. It has been stated that a prisoner, once released, has never exposed himself to the risk of being committed a second time to the walls of this prison, which, if not strictly true, is perhaps very nearly so. For an account of the mode of treatment and its results, see Miss Martineau's 'Retrospect of Western Travel,' vol. i.

The works for supplying Philadelphia with water are at Fair Mount, near the city, on the eastern bank of the Schuylkill. The projects for supplying the city with water by means of steam-engines having failed, after having been persevered in at an enormous expense for upwards of twenty years, in 1819 the present simple and efficient machinery was commenced. A dam, 1500 feet long, was thrown in a sloping direction across the Schuylkill, so as to be less exposed to the force of the current. There are eight water-wheels, which can raise nearly seven millions of gallons a day into the reservoirs on the summit of a hill 100 feet above the level of the river and 50 above the highest part of the city. The reservoirs can contain 20 millions of gallons. The water is conveyed to the city in pipes. The expense is very trifling, and the supply far beyond what either is or is ever likely to be required.

A wooden bridge of a single arch, of the large span of 340 feet, crosses the Schuylkill near the waterworks. There is a second wooden bridge, about a mile lower down, which consists of three arches supported on stone piers.

The fire-engine establishment is worthy of the highest admiration. There are thirty engine companies and sixteen hose companies, which latter supply the fire-engines with water. The firemen consist generally of young merchants and tradesmen, and are all volunteers. Each member pays a certain sum on his admission, and a small annual subscription; and a fine is imposed upon any member who attends without his waterproof dress. The institution is kept up with an enthusiastic public spirit, and fires are extinguished with a promptitude which raises the astonishment of all strangers who happen to witness an instance. About 5000 dollars are annually distributed to the different companies from the city funds.

The manufactures of Philadelphia are considerable, especially the warping-mills; there are two shot-towers, and there are manufactures of nails, leather, hardware, &c. A great trade is carried on up the Schuylkill and Lehigh, in conveying the produce of the coal-mines, one hundred miles distant, though the coal in summer is seldom under seven dollars a ton, and in winter as high as eleven dollars. It has almost superseded the use of wood. The coal is chiefly anthracite; it is hard and shining, throws out little smoke, does not blaze, and requires bituminous coal to be mixed with it, which is generally imported from Liverpool.

The municipal government of the city proper is vested in a mayor, a recorder, fifteen aldermen, a select council, and a common council. The recorder and aldermen are appointed by the governor of the state, and hold their offices during good behaviour. The mayor was chosen annually by the two councils from among the aldermen till April 10, 1826, when the legislature passed an act authorising the councils to elect him from the body of the citizens. The members of the two councils are chosen annually. They serve gratuitously, sit in separate chambers, and each body has a negative on the legislative acts of the other. The mayor, recorder, and aldermen, or any four of them, of whom the mayor or recorder must be one, constitute the mayor's court. The district court of the city and county of Philadelphia has three judges, one of whom is the president. Each judge has a salary of 2000 dollars a year.

The city proper sends seven representatives and two senators to the state legislature.

Stephen Girard, a Frenchman, who from a humble origin became a banker in Philadelphia, left nearly the whole of his large property towards beautifying Philadelphia and New Orleans, and to establish a college in the former city which should accommodate at least 300 scholars. He bequeathed two millions of dollars for building and establishing the college, the income of so much of it as remained unexpended to be employed in maintaining as many poor orphans of white parents as it was adequate to. The buildings of the Girard College were commenced some time since, and are now probably nearly completed. The whole of the buildings are of white marble.

The river Delaware, in front of the city, is about a mile wide, but the width is contracted by an island, which extends nearly the whole length of the city, and somewhat impedes the navigation. Both the Delaware and the Schuylkill are frozen over during the winter months, which renders Philadelphia, as a harbour, inferior to New York. A portion of the navy of the United States is stationed at the southern extremity of the city, and ships of the largest size are built. The Delaware is navigable for steam-boats and small vessels as high as Trenton.

The following is a statement of the number and tonnage of vessels, with the value of their cargoes, which arrived at and departed from Philadelphia in the year 1837:—

COUNTRIES.	ARRIVED.			DEPARTED.		
	Ships.	Tons.	Value of Cargoes.	Ships.	Tons.	Value of Cargoes.
			£.			£.
British .	53	10,364	39,028	53	10,364	25,239
United Stat.	322	67,449	2,066,580	255	49,087	606,362
Danish .	7	842	6,251	6	706	4,765
Hamburg	3	582	4,321	3	582	3,928
Bremen .	3	780	5,791	5	1,291	8,707
Dutch .	3	583	4,328	1	101	681
Austrian	3	930	6,905	3	930	6,277
Swedish .	2	278	2,064	2	278	1,876
French .	1	287	2,113	1	287	1,937
Sardinian	2	563	4,180	2	563	3,822
Norwegian	1	220	1,633	1	220	1,485
Total .	400	82,878	2,143,198	332	64,409	665,083

Of the 53 British vessels above mentioned, 3 were from Liverpool, with cargoes valued at 8600*l.*, consisting of iron, salt, coals, &c.; 2 from Bristol, with cargoes valued at 14,105*l.*, consisting of railroad-iron, iron for other purposes, glass, copper, &c.; 9 from Londonderry, with cargoes valued at 3373*l.*, consisting of salt and provisions; 19 from St. John's, New Brunswick, with cargoes valued at 2064*l.*, consisting of salt, plaster, fish, &c., and 20 vessels were freighted back to St. John's with provisions valued at 16,468*l.* The rest were generally single vessels from various places.

Philadelphia was founded by William Penn in 1682. On the 5th of September, 1774, the members of the first Congress assembled at Philadelphia, where they adopted the 'Declaration of Rights,' which may be regarded as the preface to the 'Declaration of Independence,' which was proclaimed at Philadelphia in April, 1776. Congress continued to sit at Philadelphia till the close of the autumn in the same year, when the approach of the British compelled them to retire to Baltimore. The British forces obtained possession of the city on the 26th of September, 1777, and occupied it till the 18th of the following June. The city remained uninjured during the remainder of the war. It was the seat of the federal government till the year 1800, and the capital of Pennsylvania till 1799.

(Arfwedson's *United States and Canada;* Coke's *Subaltern's Furlough: Encyclopædia Americana.*)

PHILADELPHI'A. [LYDIA.]

PHILADELPHUS, a genus of plants of the natural family of Philadelphaceæ, which is also the name of a tree, now unknown, mentioned by Athenæus, but was applied to the present genus by Bauhin. Philadelphus is characterised by having a calyx with an obovato-turbinate tube and a 4-5 partite limb. Petals vary in number from 4-5. Stamens, 20-40, free, are shorter than the petals. Styles 4-5 united together, or more or less distinct. Stigmas 4-5, oblong or linear, generally distinct. Capsule 4-5-celled, many-seeded. Seeds dust-like, enclosed in a membranous aril, oblong, and fringed at one end.

The plants consist of shrubs with white pedicillate flowers arranged in a corymbose cyme, in a panicle-like manner, or sometimes in the axils of their leaves, supported by bracts.

The greatest number of species are indigenous in North America, whence they have been introduced into the shrubberies of this country, to which they form a highly ornamental addition. A species has also been discovered in the Himalayas, at elevations of 6000 and 7000 feet, of which there are two varieties, sometimes considered distinct species, P. tomentosus being apparently only a more advanced state of P. triflorus. The best known species however is *P. coronarius*, commonly called Syringa, which is so easy of culture, and found in most gardens. It is supposed to be a native of the south of Europe, but it has hardly ever been found in a wild state, and even in these few cases it may have escaped from cultivation. As one species has been found in the Himalayas, there is no reason why other species should not exist still farther to the north-west, as in the Hindoo-koosh, and that the Syringa may be found to be one of those plants which was in early times introduced from some part of the Persian region of Botanists into the south of Europe.

PHILA'RETUS (Φιλάρετος), the reputed author of a short treatise 'De Pulsibus,' which is written in Greek, but of which only a Latin translation has hitherto been published. Nothing is known about his life, nor the time when he lived; nor is it even certain that he is the author of the work in question, as it is sometimes attributed to Philotheus and sometimes to Theophilus Protospatharius. It was written (as the author tells us) because he thought all former writers on the subject were either too superficial and inaccurate or too prolix; but it is not of much value, and seldom if ever ventures to differ from Galen. It consists of ten chapters, and was translated by Albanus Torinus, and published, Basil., 1533, 8vo. An older and barbarous translation is inserted in the various editions of the curious old collection of medical works called 'Articella.' The translation by Albanus Torinus is to be found also in the second volume of the 'Medicæ Artis Principes,' by H. Stephens, Paris, 1567, fol.

PHI'LEDON, Cuvier's name for a genus of *Meliphagidæ*. [MELIPHAGIDÆ, vol. xv., p. 82.]

Of this form, Mr. Swainson, in his 'Classification of Birds,' vol. ii., remarks that the head is nearly bare of feathers, and the neck surrounded with a ruff somewhat similar to that of the Vultures. Their size is nearly equal to that of a jay, and the claws are strong and acute. The same zoologist further observes, that as they are said to chase other birds of a small size, one would almost imagine they represented the rapacious order.

Mr. G. R. Gray quotes as the synonyms of his genus, *Meliornis Certhica*, Lath., *Meliphaga* (Lew.), V. and H.; and *Philedon*, Cuv., with *Meliornis Novæ Hollandiæ* (Vieill., *Ois. d'Or.*, pl. 57), *M. Balgonera*, Steph., as the type. (*List of the Genera of Birds*, 1840.)

PHILE'MON, Vieillot's name for a genus of birds (*Anthrochæra*, V. and H., *Merops*, Lath.) placed by Mr. G. R. Gray in his subfamily *Meliphaginæ*, which consists of the genera *Meliornis* [PHILEDON]; *Prosthemadera*, G. R. Gray (*Merops*, Lath., *Anthrochæra*, V. and H., *Philemon*, Vieill., *Sturnus*, Daud.—type *P. cincinnata*, Levaill., *Ois. d'Afr.*, pl. 92); *Meliphaga*, Lew. (*Ptilotis*, Sw., *Philemon*, Vieill., *Certhia*, Lath.); *Anthornis*, G. R. Gray (*Melithreptus*, Vieill., *Anthomyza*, Sw., *Furnarius*, Steph., *Certhia*, Sparr—type *A. melanura*, Sparr, *Mus. Carls.*, t. 5); the genus at the head of this article; *Phyllornis*, Boie (*Turdus*, Gm., *Chloropsis*, Jard. and Selby, *Meliphaga*, Horsf.); *Zanthomyza*, Sw. (*Merops*, Lath., *Meliphaga*, Lew., *Philemon*, Vieill., *Anthochæra*, V. and H.); *Anthochæra*, V. and H. (*Creadion*, Vieill., *Philedon*, Cuv., *Merops*, Lath.); *Acanthogenys*, Gould; *Entomyza*, Sw. (*Gracula*, Lath., *Philemon*, Vieill., *Gymnops*, Cuv., *Entomyzon*, Sw., *Tropidorhynchus*, V. and H.); and *Tropidorhynchus*, V. and H. (*Philedon*, Cuv., *Merops*, Lath.). Of these, *Anthomyza* is employed in entomology.

The other two subfamilies of *Meliphagidæ*, according to Mr. G. R. Gray's arrangement, are the *Myzomelinæ* (subfamily 1) and *Manorhininæ* (subfamily 2).

The *Myzomelinæ* consist of the genera *Myzomela*, V. and H.; *Acanthorhynchus*, Gould; and *Glyciphila*, Sw.

The *Manorhininæ* comprehend the genera *Plectoramphus*, G. R. Gray (*Plectorhyncha*, Gould); *Manorhina*, Vieill.; *Psophades*, V. and H.; *Eidopsarus*, Sw.; *Melithreptus*, Vieill.; and *Entomophila*, Gould.

Plectorhyncha had been already used in ichthyology.

PHILE'MON (Φιλήμων), a writer of the new comedy, was born at Soli in Cilicia, according to Strabo (xv., p. 671), or at Syracuse, according to Suidas (*Philemon*). Philemon began to exhibit comedies a little earlier than Menander, and before the hundred and thirteenth Olympiad, that is, B.C. 328. He lived to the age of ninety-six or ninety-seven (Lucian, *Macrob.*, 25), and died in the reign of the second Antigonus, son of Demetrius; he must consequently have been alive subsequent to B.C. 283. He is said to have written 97 comedies, of which Fabricius, in his 'Bibliotheca Græca' (vol. ii., p. 476, ed. Harles), has preserved the titles of fifty-three. Of these comedies, fragments only have come down to us, which are usually published with those of Menander, of which the best edition is by Meineke, Berl., 1823. It seems possible that some of these plays may exist; at least there is evidence that some if not all of them were in existence in the seventeenth century. (*Journal of Education*, vol. i., p. 188.)

Philemon was the great rival of Menander, and was considered superior to him by many of their contemporaries; but posterity, as Quintilian informs us (*Inst. Orat.*, x. 1., p. 222, ed. Bipont), regarded him as inferior to Menander. From the 'Mercator' of Plautus, and the fragments which remain of his plays, Philemon appears to have closely resembled Menander, of whose style, and of the new comedy in general, an account is given under MENANDER.

The son of Philemon is also said to have written comedies. (*Athen.*, vii., p. 291, E.) Suidas says that they were fifty-four in number

There is extant a grammatical work entitled 'Lexicon Technologicon' (Λεξικὸν τεχνολογικόν), written by a grammarian of the name of Philemon, who probably lived in the twelfth century of the Christian æra. This work is divided into eight books, according to the eight parts of speech, which are respectively treated of in each book. The Greek text was first published by Burney, Lond., 1812, 8vo.; but a more accurate edition, with valuable notes, was published by Osann, Berlin, 1821.

PHILE'MON, EPISTLE TO. Philemon was a man of distinction, if not a presbyter, of the church at Colossæ, and was probably converted from heathenism by St. Paul. Theodoret, who wrote at the beginning of the fifth century, says that in his time Philemon's house was yet standing. He had a slave named Onesimus, who robbed his master and fled to Rome, where he met with St. Paul, a prisoner there, about A.D. 62, and through him he became reformed. St. Paul then wrote the 'Epistle to Philemon,' and sent it to Colossæ by Onesimus, recommending him to the kind consideration of his injured master; stating how sincere was his penitence, how excellent a Christian he was, how much he had won the affection of his spiritual father, and how worthy therefore he was to be regarded henceforth by Philemon as a brother rather than a slave, and adding the expression of confidence in the readiness of Philemon to receive Onesimus even more heartily than he was desired.

The epistle of St. Paul to Philemon furnishes a beautiful specimen of gentleness united with commanding authority, in the style and manner of the writer. The Greek original evinces extraordinary skill in the choice and arrangement of words; so that any reader who has well studied the other Pauline epistles, would conclude this epistle to be undoubtedly St. Paul's. Moreover, there is all the historical evidence that can be required to prove it a canonical book.

Onesimus is said by Jerome and others to have become at length a bishop, but whether of Ephesus, as Grotius thinks, or of some other place, is uncertain.

The Apphia mentioned in the epistle is supposed to have been Philemon's wife, and they are said to have been both stoned to death under Nero. In the calendar of the church of Rome the names of Philemon and Apphia occur as those of saints, as does also the name of Onesimus, the two former being commemorated November 22, the latter February 16.

(Theodoret, *On St. Paul's Epistles*; Fabricius, *Bibliotheca Græca*; Butler's *Lives of the Saints*; Schott's *Isagoge*.)

PHILES, or PHILE (MANUEL), (Μανουὴλ Φιλῆς, or Φιλῆ), a native of Ephesus, to be distinguished (according to Fabricius, *Bibl. Gr.*) from four other persons bearing the same surname. As his work is dedicated to the emperor Michael Palæologus the younger, he must have lived about the beginning of the fourteenth century. He was born of poor parents, came at an early age to Constantinople, became one of the pupils of George Pachymer, and made great progress in literature. He afterwards gave offence to the emperor by some expressions made use of by him in one of his works, called 'Chronographia,' which is no longer extant, and was thrown into prison. He is supposed to have died somewhere about the year 1340. He is known chiefly as the author of a work Περὶ ζώων ἰδιότητος, 'De Animalium Proprietate,' written in a sort of barbarous Greek iambics, called 'versus politici.' (See Is. Vossius, 'De Poematum Cantu et Viribus Rythmi,' Oxon., 8vo., 1673, p. 21, sq.) It is a curious work, but of little or no value to a zoologist, taken almost entirely from Ælian's 'Natural History,' and full of the most absurd fables. It was first published at Venice, 1533, 8vo., Græce, by Arsenius, archbishop of Monembasia (a town on the east coast of Laconia, now called Napoli di Malvasia). An edition was published at Leipzig, 1574, 4to. (or, with a fresh title-page, Heidelb., 1596), Gr. et Lat., by Bersmann, in which the Greek text was altered in a very arbitrary manner by Camerarius, who had persuaded himself that the numerous false quantities that he found in the verses were merely the mistakes of the transcribers. I. Corn. de Pauw's edition, Traj ad Rhen., 1730, 4to., Gr. et Lat., is augmented by some fragments taken from a MS. in the Bodleian Library at Oxford, which Fabricius had before inserted in his 'Biblioth. Græca:' it is not very highly esteemed, and was severely criticised by D'Orville, in the sixth volume of Burmann's 'Observationes Miscellaneæ.'

An edition of the other poems of Philes (some of which had been inserted by Fabricius in his 'Bibl. Gr.') was published, Lips. 1768, 8vo., Gr. et Lat., by Wernsdorf, with notes and an excellent preliminary dissertation on the Life and Works of Philes. The longest poem in the volume is one of nearly a thousand lines written in the same barbarous kind of verse, in the form of a dialogue between the author and the city of Constantinople, which he designates by the name Νοῦς, *mens*. It is composed in praise of Joannes Cantacuzenus, who was afterwards emperor, and in it is introduced a personification of his several virtues, Prudence, Fortitude, Justice, Temperance, Truth, Memory, Pity, Clemency, Sagacity, Rectitude, Continence, and Modesty. The other poems consist of epigrams and various shorter pieces, together with one of nearly four hundred verses on the Elephant, addressed to an emperor named Leo, which (as no emperor of that name was contemporary with Philes) probably belongs to some other person. (*Miscell. Observ. in Auctor. Vet. et Rec.*, vol. ii., tom. iii., p. 425.) Two other short poems, in the same metre as the rest, are to be found in the first volume of Cramer's 'Anecdota Græca Parisiensia,' p. 43, Oxon., 8vo. 1839. Wernsdorf gives, in his 'Preliminary Dissertation,' a list of several works by Philes which still remain unedited in various libraries of Europe. (Fabr., *Bibl. Gr.* and *Biogr. Univers.*, as the writer has not been able to consult Wernsdorf's 'Dissertation.')

PHILE'TAS, a grammarian and poet of the island Cos, flourished in the times of Philip and Alexander the Great, and was preceptor to Ptolemy Philadelphus. He wrote epigrams, elegies, and other poems, and died of emaciation brought on by excessive study. (Suidas, *Lexicon*.) Fragments of Philetas and two other poets were edited by Bachius, 8vo., Halle, 1829.

PHILIDOR, ANDRE', a French dramatic composer of eminence in his day, but better known out of his own country as a most distinguished and unrivalled chess-player, was born at Dreux in 1726. His grandfather was musician in ordinary to Louis XIII.: his father held the same office, and his uncle established, in 1726, the famous *Concert Spirituel*. André was admitted at the usual early age as a page, or chorister, in the chapel of Louis XV., and studied under Campra, *Maître de la Chapelle*. In 1737, when he had only completed his eleventh year, he produced a motet for a full choir, for which the *Grand Monarque* deigned to thank him; but it does not appear that this condescension was followed by any acknowledgment of a more solid kind, for after quitting the chapel on his voice changing, he subsisted for some time by copying music—a drudgery to which Rousseau was obliged to submit—and in giving a few lessons. But all his vacant hours, and these were many, he devoted to the game of chess, in which his proficiency was so great, that he sought to profit by his skill, and in 1745 commenced a tour in Holland, Germany, and England. This also enabled him to improve his knowledge and taste in music, by hearing the best works of the great masters. He tried his strength as a composer in London in 1753, by setting Congreve's Ode to Harmony, which Handel heard, who approved his choruses, but thought him defective in melody. Chess however had occupied more of his thoughts than his avowed profession, and he had previously, in 1749, published his *Analysis of the Game of Chess*, for which he obtained a great list of subscribers, and his reputation was established. This work gives several games, with notes explaining the reasons for the moves; and thus it is the most useful of all books for those who study chess.

In 1754 he returned to Paris, and devoted himself wholly to his profession. He composed some sacred music, which the king thought too much in the Italian style, and thus his effort to obtain the appointment of *Maître de la Chapelle* was frustrated. Four years after this he turned his attention to dramatic music, and produced at the *Opéra-Comique* many works, most of which proved eminently successful, insomuch that M. de Laborde, in his voluminous *Essai sur la Musique*—a work to which we are indebted for most of the foregoing—does not hesitate to pronounce him one of the greatest of French composers. The author of the *Dic-*

tionnaire des Musiciens considers him to have been, together with Duni and Monsigny, the joint father of the *Opéra Comique*, but adds that, though he was a profound harmonist, he was not so happy in melody.

In 1777 Philidor reprinted his treatise on chess, considerably augmented. In 1779 he produced at Free-Masons' Hall, in London, the *Carmen Seculare* of Horace, set to music, consisting of airs, choruses, &c., which it was rumoured he had written in imitation of the antient music, though such had never been his intention, and some disappointment was excited in many who expected a revival of those miraculous effects, in which a few were still credulous enough to believe. This was published in 1788, in a splendid volume in score, dedicated to Catherine of Russia; and as the work is now before us, we are enabled to corroborate what Dr. Burney has said of it;—that the choruses are after the model of Handel, and the airs after those of his own and Gretry's comic operas, many of which, 'particularly Gretry's, would be elegant and pleasing music anywhere.' It was again performed, under the composer's direction, in 1788, at an entertainment of a mixed kind given by the Knights of the Bath at the Pantheon. From that period Philidor seems to have passed much of his time in London, chiefly occupied by the game of chess, at which he played at Parsloe's (now the Albion Club) in St. James's Street, where, we believe, persons were admitted to witness his exploits, on the payment of a small fee. It was there he exhibited his marvellous powers, by playing three games, against different adversaries at different boards, all at the same time. And only two months before his decease he played two games, blindfolded, simultaneously, against very expert players, and was victorious.

His health now rapidly declining, he applied for a passport to return to his native country, but was refused, having been, most unjustly, proscribed by the French government as a suspected person. This affected him deeply; his grief admitted of no alleviation, and he died in London, in 1795.

Philidor was a very worthy and amiable man; but it was the generally-received opinion that his mental powers were almost exclusively confined to music and chess.

PHILI'NUS (Φιλῖνος), a Greek physician, born in the island of Cos, was one of the pupils of Herophilus, and (according to Galen, *Introduct.*), the founder of the sect of the Empirici. [EMPIRICI; SERAPION.] He lived somewhere about the year B.C. 250 (Ol. 132, 3), wrote a work on botany (Athen., *Deipnos.*, lib. xv., sec. 28, pp. 681, 682), which is probably the work quoted by Pliny (*Hist. Nat.*, lib. xx., cap. 91), and some commentaries on the aphorisms of Hippocrates (Erotian, *Lex. Voc. Hippocr.* in ἄμβην), neither of which works is now extant. With respect to the system of the Empirici, the rejection of anatomy, physiology, and pathology as useless studies, would of course, at least in the opinion of modern physicians, prevent their ever attaining any higher rank than that of clever experimentalists; but still it must not be denied that Materia Medica is indebted to them for the discovery of the properties of many valuable drugs. A parallel has been drawn between the antient Empirici and the modern Homœopathists, by Fred. Ferd. Brisken, entitled 'Philinus et Hahnemannus, seu Veteris Sectæ Empiricæ cum Hodiernâ Sectâ Homœopathicâ Comparatio,' 8vo., Berol., 1834, pp. 36.

PHILIP, the name of several kings of Macedonia, of whom two deserve particular notice. [MACEDONIA.]

PHILIP, a younger son of Amyntas, succeeded (B.C. 359) at the age of twenty-three years to a throne which, since the death of his father, and during the reigns of his two elder brothers, Alexander and Perdiccas, had been shaken to its foundation by foreign invasion and civil war. Fortunately for the independence of his kingdom, the young monarch was endowed with talents and energies of the highest order; and a residence during his boyhood at Thebes, whither he had been sent as a hostage in the best days of the republic, while the celebrated Pelopidas and Epaminondas were in power, had obtained for him all the advantages of a liberal Grecian education. On his accession to the throne, his inheritance was overrun by the victorious Illyrians, who had defeated and slain his brother Perdiccas; his own title was disputed by two pretenders to the crown; and the people of Macedonia were dispirited by accumulated national calamities. But his courage and eloquence revived the hopes of his subjects; and his military skill and activity soon inspired them with confidence. While these qualities were successfully exerted in the field, negotiations and bribes were as artfully employed to induce the supporters of the rival claimants to abandon their cause; and Philip finally not only repelled the Illyrian and Pæonian invaders of his country, but penetrated in turn into their territory, and extended his own dominions at their expense. He subsequently further strengthened himself by a marriage with Olympias, daughter of the king of Epirus, who became the mother of Alexander the Great, but whose temper and conduct made her so little agreeable to her husband, that he finally divorced her.

From the period of the full establishment of his authority over his native kingdom, Philip seems to have commenced the design, which he thenceforth steadily pursued and ultimately accomplished, of destroying the power and influence of the Athenian people on the northern shores of the Ægean Sea. As his projects, both on the present occasion and subsequently, brought him into frequent collision with that republic, the state of affairs at Athens throughout his reign requires some detailed notice.

After the general peace which followed the battle of Mantineia and death of Epaminondas (B.C. 362), Athens had again become the most prominent state in Greece. The naval successes and moderation of Timotheus and a a few other officers of similar character had won her the public respect; and the people of the Ægean islands and coasts, to secure the protection of her navy against piracy, had resumed their relations to her as subject allies. She had thus nearly recovered the naval supremacy lost by the fatal termination of the Peloponnesian War: but this brief renovation of glory was soon obscured by a relapse into former habits of oppression towards her allies; and these produced (B.C. 358) the Confederate or Social War, by a league of some of the dependent islands and towns against her, which lasted three years, and ended in the loss of her sovereignty. Philip ably took advantage of the distraction of Athens in this contest to reduce or win over in succession Amphipolis, Pydna, Potidæa, and other towns on the northern shores of the Ægean, until in those parts Methone alone remained in the Athenian interest. Some conquests in Thrace also gave the Macedonian prince possession of the gold-mines of Pangæus; and near these he built or enlarged a city, which he peopled with Greeks from the conquered towns, and named after himself Philippi. Here, under his personal inspection, the mines were worked to such advantage, that they produced him one thousand talents annually; and the gold 'Philips' which he coined served him in the sequel both to bribe the venal orators of the Grecian states and to hire the mercenary troops with which he now openly assailed their freedom.

The ambition of Philip indeed soon taught him to extend his views of aggrandisement into Greece itself; and, at whatever epoch the plans were organised which he formed and realised for the acquisition of a general supremacy over the Grecian states, the first occasion for interfering in their domestic politics was afforded to him by the Phocian or Sacred War, which had already commenced before the close of the contest between Athens and her allies. The real cause of the persecution of the Phocians was the hatred with which that people had inspired the Thebans by refusing to join them in the late war against Sparta. To this source of political enmity were added some uncertain motives of personal offence between individuals of the neighbouring communities; and, moved by such passions of public and private revenge, the Thebans rashly excited a commotion which was doomed eventually to bring destruction upon their own state, as well as to annihilate the general liberties of Greece. Availing themselves of their influence in the Amphictyonic Council, of which they hoped also to obtain the absolute control, as well as the command of the temple of Delphi and its treasures, by destroying the Phocians, they accused that people of having cultivated lands which had been devoted to the Delphic god. The Phocians were found guilty by the compliant Amphictyons, and condemned to pay a fine so enormous, that for its liquidation their whole country was declared forfeit to the god. Perceiving that their only appeal against this iniquitous sentence must be to arms, the Phocians anticipated their enemies by boldly seizing upon Delphi (B.C. 357), and, supported by Athens and Sparta, they commenced a sanguinary war with the Thebans and their allies.

During the progress of this struggle, Philip gained a footing in Thessaly by assisting some of the Thessalian nobles, or the Aleuadæ, the antient allies of Macedon, against the tyrants of Pheræ, who were supported by the Phocians and their Athenian confederates. The successful interference of Philip in this quarter brought him into opposition with Athens; but the jealousy of that republic was still more excited by his continued machinations against her influence on the Thracian coasts. When she attempted, in conjunction with the people of Methone, to repel these injuries by hostilities, he suddenly appeared before that place, and took it, after an obstinate siege, in which he lost his left eye by an arrow. The people of Olynthus, hitherto his allies, now taking alarm at his ambition, applied to Athens for aid against him; but though the Athenians, moved by the eloquence of Demosthenes, repeatedly sent reinforcements to the Olynthians, Philip defeated the confederates, and finally besieged and captured Olynthus (B.C. 347). After this event, both the Athenians and the Macedonian prince were equally desirous of peace, and in the following year a treaty was concluded between them. But the ambassadors who were sent to Philip to arrange the terms suffered themselves to be either outwitted or bribed by the artful monarch; and the Phocian allies of Athens were excluded from the benefits of the treaty.

That brave and unfortunate people, who had hitherto maintained the war with advantage, were now abandoned to the mercy of their more numerous and powerful enemies. The Thebans, who were nearly exhausted in the struggle, applied to Philip for aid, which he was but too happy to render. From Thessaly, passing the defiles of Thermopylæ, which had been left unguarded, he marched rapidly into Proper Greece; and, profiting by the misconduct of party leaders and the treachery of the Phocian general, he was completely successful. The Phocians were compelled to surrender unconditionally; the Amphictyons assembled, and decreed that their towns should be destroyed and the inhabitants disarmed and heavily assessed; and their privileges at Delphi and votes in the Amphictyonic Council were solemnly transferred to the pious monarch of Macedon. Thus ended (B.C. 346) the Sacred War, which ruined an innocent people and destroyed the little reverence for religion that had yet remained in Greece.

The crisis was now approaching in the great struggle between Athens and Philip, which, on the part of the former, was for the independence of Greece, and on that of the latter, for the general supremacy in her national government and councils. But the contest was almost as much one of factions at Athens itself, as between the republic and the Macedonian king. The aristocratic party in that city inclined, perhaps naturally, to the side of Philip, through conviction of the degenerate character of the democracy and consequent hopelessness of a successful collision with the power of Macedon, which they either thought it useless to resist, or considered not likely to be injurious to their country. They might also sincerely believe that in Greece, for all the evils of intestine commotions of which they were weary, there remained no cure but a general diversion, headed by Macedon, of the national energies against Persia. Their leaders were the venerable Isocrates and upright Phocion, both patriots of unquestionable integrity, and anxious for the independence of Athens. But it was the misfortune of this party, that its ranks gave shelter to the venal orators, such as Æschines, Demades, and others, who were undoubtedly in the pay of Philip, and who basely promoted his designs. On the other hand the democratic, or war party, as a modern historian has termed it, ever eager for the licence and plunder which were promised by a state of hostilities, was principally guided by the infamous Chares, to whom, together with the mercenary Charidemus, the conduct of military expeditions was often entrusted. But to this party, through a well-founded persuasion of the ambitious project of Philip, and a generous and patriotic enthusiasm for the independence of his country, had the great Demosthenes attached himself, and a view of the principles upon which he acted will be found in a former article. [DEMOSTHENES.]

After the conclusion of the Phocian war, Philip turned his attention for a time again to the northward of Greece, and laboured to consolidate his empire in that quarter by obtaining possession of the cities of the Propontis and Thracian Chersonese. But Demosthenes had now roused the Athenians to so much alarm and energy, that when the Macedonian attacked and invested Perinthus and Byzantium, a strong armament was fitted out at Athens, which, under the command of Phocion, compelled him to raise the siege of those cities (B.C. 339). This was perhaps the most glorious moment in the life of Demosthenes, and the most mortifying check in the successful career of Philip. But the triumph of the great orator and the disappointment of the ambitious prince were alike only momentary; and the event soon proved how unequal was the conflict between the desultory impulse which could be given to a fickle and divided democracy, without secrecy, unity, or consistency of purpose, and the concentrated power of a monarch of high talent and immense resources, whose politic designs were veiled in the profoundest mystery until they were ripe for execution by adroit ministers, experienced generals, and well-disciplined armies. In the very next year after his repulse before Byzantium, Philip found a pretext for appearing again in arms in Greece itself. He was appointed by the obsequious Amphictyonic council their general in a new sacred war which they had denounced against the people of Amphissa for cultivating some devoted lands; and after reducing that city, he suddenly threw off the mask by seizing Elateia, the key of Bœotia, at the head of 32,000 veteran troops. The Athenians were filled with dismay; but the eloquence and activity of Demosthenes both animated them to signal exertions, and induced the Thebans, Corinthians, and others to join with Athens in the cause of independence. The numerical superiority of the confederates however, though they fought with great bravery, could not prevail against generalship and discipline; and the fatal battle of Chæroneia (B.C. 338) for ever extinguished the liberties of antient Greece.

Nothing was more characteristic of the disposition and policy of Philip than his conduct after the battle of Chæroneia. As soon as the victory was secured, he immediately, with his usual humanity, stopped the slaughter; and when, on revisiting the field next morning, after a night of carousal, he beheld the dead Thebans of the Sacred Band lying in ranks where they had valiantly fought and fallen, he is said to have shed tears, and exclaimed, 'Perish they who imagine these to have done or suffered shame!" But this burst of admiration did not prevent him from treating the party that had been hostile to him at Thebes with great severity; and he imposed a Macedonian garrison upon the subjugated city. To the Athenians, on the contrary, he behaved with the greatest clemency, dismissing without ransom those among them who had been made prisoners, and granting their republic peace upon very easy terms, the principal condition being that they should send deputies to a general congress of the Amphictyonic states at Corinth. Here the great object of the ambition of Philip seemed to approach its fulfilment. After his orators had set forth the injuries which Persia had continually inflicted upon Greece, it was unanimously resolved in the assembly that a national war should be declared against the Persian empire, and that the Macedonian king should be appointed commander-in-chief, with power to apportion the contingent of each Grecian state. But when he was making the most active preparations for the great expedition which he meditated, and which his son was destined to accomplish, his days were cut short by the hand of an assassin. While celebrating the nuptials of his daughter Cleopatra with the king of Epirus, he was stabbed by a young Macedonian of his own body-guard, Pausanias, whose motive for the deed, as he was himself put to death on the spot, could not be ascertained, but has been most probably ascribed to personal revenge, on the king's refusal to grant him redress for an intolerable insult which he had received from the queen's uncle.

Thus fell Philip (B.C. 336), at the early age of forty-seven years, and in the full vigour of life and intellect, at the moment when he seemed to be entering on the meridian splendour of his career of glory.

The character of Philip of Macedon has often been sketched, like too many other historical portraits, in the spirit of party. A distinguished historian of our own times has depicted all his actions in the most favourable colours, apparently with no better object than to blacken the general cause of democracy in the conduct of his Athenian opponents. On the other hand, the ardent advocates of republican freedom have not unnaturally been led to regard the Macedonian king with strong prejudice as the exemplar of monarchical tyranny. Of all the princes of antiquity however, it would be difficult to name one worthy of comparison with Philip in the fairer features of his character. His government of his own kingdom must be judged, by the silence of his opponents, to have been mild, just, and popular. Personally kind to his enemies, he was to a singular degree free from that cruelty which was the common reproach of the Greeks of his age: humane, generous, and magnanimous, he often showed himself capable of forgiving injuries, of sparing the vanquished, and of using success with moderation. It was indeed his boast and his truest glory, that he conquered more by mercy and conciliation after victory than by mere force of arms. His splendid abilities were equally conspicuous as a statesman and a general; and his intellectual tastes for literature and philosophy, for the drama and the arts, were alike refined and passionate. He made his court, therefore, no less the seat of eloquence and mental cultivation than it was the school of consummate political science. That he was as insatiable in his ambitious schemes as he was unscrupulous in the means which he employed to advance them, is true: he hesitated as little as most politicians at corruption and perfidy. But his ambition was not of a vulgar cast; nor while the conquest of the vast Persian empire was its magnificent project, does he at all seem to have aimed at the internal subjugation of the Grecian states, or to have desired more than the supreme authority to lead their free and enlightened confederation against the barbarism of the East. The vicious intemperance of his private life will not bear any comment; but his vices, like his accomplishments, were those of the Greeks, and of the state of society which produced them: his virtues were peculiar to himself, and superior to his times.

Coin of Philip II.
British Museum. Actual size.

PHILIP, the only other of the Macedonian kings of that name whose life and reign merit some attention, ascended the throne (B C. 220) at an early age, on the death of his uncle Antigonus Doson. He was the grandson of Antigonus Gonnatas, and therefore lineally descended from the first Antigonus, one of the generals of Alexander the Great, whose family, in the vicissitudes which succeeded the dismemberment of that conqueror's empire, had finally obtained the crown of Macedon and a general ascendency over the affairs of Greece. Philip was an able prince, whose character, both in its political energies and personal vices, was not without some points of resemblance to that of his greater namesake and predecessor on the Macedonian throne. At the commencement of his reign, the struggle between the Ætolian and Achæan leagues, in which the latter people had been worsted, caused them to call in his aid; and in the war which followed, and in which he was placed at the head of the Achæan confederation, his activity and military skill were much distinguished. His successes soon disposed the Ætolians to peace, which he as readily granted them, in order that he might direct his sole attention to Italy, where the disasters of the Romans in the second Punic War inspired him with the hope that, by throwing his weight into the Carthaginian scale, he might finally acquire the preponderance of power for himself. With this view, after the battle of Cannæ (B.C. 216), he formed with Hannibal an alliance offensive and defensive, which he prosecuted with little vigour, but which ultimately proved his own ruin; for the Romans, after the great crisis of their fate was over in Italy, no sooner began to prevail in the struggle with Hannibal, than they determined to take vengeance upon Philip for his aggression. After some intervals of indecisive hostility and hollow pacification, during which they found means to deprive him of most of his allies in Greece, they declared war anew against him on various pretexts; and at length he sustained from the consul T. Quinctius Flamininus, at Cynoscephalæ, in Thessaly (B.C. 197), a defeat so decisive, as for ever to break the Macedonian power. Philip however, after this calamity, obtained peace on terms less severe than might have been anticipated: but his proud and restless spirit could ill brook the subjection to which he was reduced; and the remaining years of his life were passed in covert preparations for a new war with Rome, which he saw to be inevitable. He died (B.C. 179) just before the last crisis in the fortunes of Macedon, leaving his unworthy son Perseus to abide the struggle which was to bereave him of his crown and liberty.

The original materials for the life and reign of the first of these two Philips are scattered through the extant orations of Æschines and Demosthenes, the compilation of Diodorus Siculus, and the Lives of Demosthenes and Phocion by Plutarch. Among our modern historians, Mitford has given an elaborate though far too favourable view of his actions and character. The original authorities for the reign of the last Philip are Polybius and Livy.

PHILIP, ST., was the first disciple of Jesus Christ, and one of the twelve apostles. He was a native of Bethsaida, a town near the sea of Tiberias. After his call to the apostleship not much is recorded of him in the New Testament. He has sometimes been confounded with Philip the Deacon, mentioned in the Acts of the Apostles; but a little examination will plainly show that they were quite different persons.

Nicephorus Callisti tells us that in the distribution of regions made by the Apostles for their respective spheres of labour, St. Philip had Syria and Upper Asia assigned to him, with St. Bartholomew; and that having there made numerous converts, he came into Hierapolis in Phrygia, where he succeeded in bringing many of the inhabitants from gross idolatry to the belief and practice of Christianity, on which account he was at length seized by the authorities, imprisoned, and scourged, and then martyred by being hanged upon a pillar, but in what year is not stated.

The Gnostics attributed a book to St. Philip, which they called his Gospel; but no other sect ever pretended that this apostle left any writings.

The feast of St. Philip is observed by the Eastern churches November 14th, but by the Western on the 1st of May

(Isidore of Pelusium; Nicephorus Callisti; Cave, *Lives of the Apostles*.)

PHILIP OF THESSALONI'CA. [ANTHOLOGY.]

PHILIP was the name of five Spanish sovereigns, four of whom were of the house of Austria, and one of the Bourbon family.

PHILIP I., king of Castile, surnamed the Handsome, was the son of Maximilian I., emperor of Germany, by Mary of Burgundy, in right of whom he inherited and transmitted to his posterity of the house of Austria, the seventeen provinces of the Netherlands. In the year 1496 he married Joanna, or Jane, eldest daughter of Ferdinand the Catholic and Isabella, sovereigns of Aragon and Castile; and in 1504, on the death of Isabella, who bequeathed the kingdom of Castile to her daughter Jane, Philip, as well as his consort, assumed the regal title. He was crowned at Burgos with her; and in consequence of her mental weakness, exercised all the functions of government during the short remainder of his life, which closed in the following year, at the early age of twenty-eight.

His queen Jane survived him for fifty years, in a state between insanity and fatuity; and her malady is said to have been much aggravated by grief at his death, though he had never loved her. She traversed her kingdom, carrying his dead body with her, and causing it to be uncovered at times that she might behold it; until she was at last persuaded to permit its removal and interment. She had by Philip, besides daughters, two sons, both in the sequel emperors of Germany, as Charles V. and Ferdinand I., the elder of whom, Charles, on the death of his grandfather Ferdinand the Catholic, finally re-united the crowns of Castile and Aragon. But such was the attachment of the nation to their insane queen, that throughout her long life she was always recognised as sovereign of Spain in conjunction with her son; and their names were mentioned together in every formal act of government.

PHILIP II., king of Spain, the only legitimate son of the emperor Charles V. by Isabella of Portugal, was born in the year 1527, and ascended the Spanish throne on his father's abdication in 1556; having in the preceding year entered on the government of the Netherlands, which Charles had in the same manner resigned to him. His inheritance also included the kingdom of the Two Sicilies, Milan with other Italian provinces, and the empire of the New World; and it was a true and expressive phrase for the extent of his power, that 'the sun never set upon his dominions.' The revenues which he drew from the American mines and his European realms far exceeded those of any prince of his times, and are declared to have amounted to twenty-five millions of ducats yearly. His navy was more numerous than that of any other power; and his veteran armies were composed of the best troops, led by the ablest generals of the age.

As the reign of Philip II., which fills a long and important period in European history, received its dark colouring from his personal qualities, a slight preliminary sketch of his private character will best illustrate the features of his policy and the events which it produced. He was naturally of a stern and morose temperament; and the austerities of a monastic education, aggravating this constitutional defect, had extinguished in his soul every joyous emotion. As he had also been deeply imbued from his youth with religious doctrines, the very sincerity of his belief acting upon a cold heart, a gloomy temper, and a narrow mind, was sufficient to render him obstinately bigoted and inexorably cruel. In temporal affairs, the despotic principles in which he had been brought up had filled him with extravagant ideas of regal authority; and his father's example had taught him to aspire to universal monarchy. With a superstitious creed he therefore mingled the most unbounded schemes of worldly ambition; and perhaps conscientiously believing that with his own projects of dominion he was promoting at the same time the glory of God, he pursued without remorse the most inhuman course of religious persecution and civil tyranny.

Philip has therefore truly been represented as a monster of bigotry and cruelty; but it appears unjust to add to these revolting qualities, as some writers have done, the reproach of hypocrisy. Schiller, who has deeply studied his character with philosophic scrutiny, and whose feelings are anything but favourable to him, yet concludes, with more candour and acuteness (*Abfall der Niederlande*), that he was a better man than his father: since Charles V. was a persecutor only from policy, but Philip from conviction. Charles made religion subservient to his views of temporal aggrandisement; Philip often sacrificed his true political interests to what he conceived to be the service of religion. The emperor held the pope a prisoner, while he burnt others for denying his supremacy: his son engaged only with deep reluctance in a legitimate war against pope Paul IV.; and in order to purchase a reconciliation with that arrogant pontiff, he abandoned the fruit of victory like a repentant criminal. The indulgence of sensual passion has been adduced as another proof, no less than his cruelty, of the hypocrisy of Philip's religious pretensions: but the occasional licence of his private life in this respect was one of those inconsistencies which have sullied purer minds. There seems indeed no reason to doubt the sincerity of Philip's faith; it is more rational and useful to observe the fatal perversion of principle, by which the infliction of torture and death is imagined to be an exercise of virtue, a religious duty, and an acceptable offering to the God of mercy.

The marriage of Philip II. with Mary, queen of England, which had taken place in 1554, enabled him, soon after his accession to the Spanish crown, to engage his consort's kingdom with his own, in 1557, in a war against France. The only memorable event of this contest was the victory of St. Quentin, gained by his troops. He was not himself present at the battle: but at the subsequent assault of the town he showed himself in armour to encourage the soldiery, though without sharing their danger; and it was observed that this was the first and last time in which he wore a military dress or appeared on the field. The war was concluded in 1559, by the peace of Cateau Cambresis, upon terms advantageous for Philip. He had meanwhile, by the death of Mary, to whom he had been a cold and unkind husband, lost his connection with England. Leaving his provinces of the Netherlands under the government of his natural sister Margaret, duchess of Parma, Philip sailed for Spain, which he never quitted again; and his arrival in that kingdom was immediately followed by a sanguinary persecution, through which he succeeded in crushing the germs of the Reformation in the peninsula. He was present at an *auto-da-fe*, or public act of faith, at which forty unhappy persons were led to the stake by the Inquisition. When passing him, one of the victims in this dreadful procession appealed to him with loud cries of mercy: 'Perish thou and all like thee!' was his merciless reply. 'If my own son were a heretic, I would deliver him to the flames.'

It was amidst such scenes that he accomplished a vow made to heaven and to St. Lawrence, on the day of which saint the battle of St. Quentin had been gained, to testify his gratitude for that victory. At the village of Escurial, near Madrid, he built a superb palace, to which, in honour of the saint and of the instrument of his martyrdom, he gave the form of a gridiron. At the same period he transferred the seat of government from Toledo, the antient capital of Castile, to Madrid, which latter city thenceforth became the metropolis of Spain. In the south of that kingdom, his persecution goaded to revolt the Moorish population, who had compounded for the quiet possession of their native seats by a pretended conversion to Christianity; and after a furious contest, embittered by religious hatred and marked by horrid atrocities on both sides, a portion of the Moors were driven to seek refuge in Africa, and the remainder (A.D. 1571) reduced to submission.

Meanwhile Philip diligently applied himself to the extirpation of heresy in the rest of his dominions. In his Italian possessions, both of Milan and Naples, fire and the sword were successfully employed for this purpose; but the attempt to establish the Spanish Inquisition in the Netherlands with the same view, first provoked a spirit of insurrection (A.D. 1566), which, throughout the remainder of his long reign, exhausted his immense resources of men and money, and after the frightful devastation of those fertile and flourishing provinces, for ever tore seven of them from the Spanish monarchy. When Philip found that the government of Margaret of Parma wanted strength to enforce his religious edicts in the Netherlands, he replaced her by the ferocious Ferdinand Alvarez de Toledo, duke of Alva. The character of this man's administration may be estimated by his sanguinary boast, that in less than six years he had consigned 18,000 heretics to the stake and the scaffold, before his master was compelled, by the failure of his cruel measures, to recal him. The milder government of his successor Requesens; the warlike renown, the energies, and the artifice of Don John of Austria, natural brother of Philip (who had gained for him the great naval victory of Lepanto over the Turks in 1571); and the military genius of Alessandro Farnese, duke of Parma, the ablest general of his times;—were all in succession equally ineffectual to suppress the revolt of the Netherlands. William the Silent, prince of Orange, whose deep enmity Philip had provoked, proved the most dangerous of his insurgent subjects; and under that prince and his son Maurice, they successfully prosecuted a struggle, of which the principal events are related under another head. [NASSAU, HOUSE OF.]

While the bigoted tyranny of Philip was thus dissevering seven provinces of the Netherlands from his dominions, he unexpectedly acquired possession of another kingdom. On the death of Henry, king of Portugal, without issue, Philip as his nephew asserted his title to the succession; and his power easily enabling him to prevail against his feeble competitor, Don Antonio de Crato, his troops, under the Duke of Alva, entered Lisbon, and in two months (A.D. 1580) annexed the Portuguese crown and colonial dependencies for sixty years to the Spanish monarchy.

This acquisition seemed but a step to the universal dominion at which Philip aimed; and in the pursuit of his double ambition of extending his sway and extirpating the Protestant faith, the remainder of his life was passed in designs for subjugating both France and England. In the former country, after secretly allying himself with the queen mother, Catherine de' Medici, and the Romish party, for the destruction of the Huguenots, he subsequently and openly supported the Catholic league, under the Guises, against Henri IV.; and it was not until that sovereign, by changing his religion, completed his victories over the league, that the subtle tyrant of Spain abandoned his hopes of reducing France to subjection. His project for the conquest of England was more avowedly proclaimed, and more disgracefully defeated. But it is needless in this place to repeat the narrative, so glorious in our annals, of the destruction of the magnificent fleet of one hundred and fifty vessels of war, which, under the presumptuous title of the Invincible Armada, Philip had equipped for the reduction of this island (A.D. 1588). The manner in which he received the mortifying intelligence of the annihilation of his fondest hopes by the shipwreck as well as the defeat of his navy, displayed some greatness of mind as well as religious resignation: 'I sent my fleet,' said he, 'to combat with the English, but not with the elements: God's will be done!'

The close of Philip's reign and life must have been embittered by the failure of all his plans of ambition and intolerance. The contest in the Low Countries was daily becoming so adverse to the Spanish arms, that one of his last acts was an abdication of his title over the whole of those provinces in favour of his daughter Isabella and her consort the

Archduke Albert. His haughty spirit was reduced to submit to this measure, as the only remaining expedient for preventing the total alienation of the Netherlands from his house. England and France also had escaped from his toils; and the peace of Vervins, which he was compelled to conclude with Henri IV., left that sovereign securely established on the French throne. Philip died in the same year (A.D. 1598), at the age of seventy-two, after protracted and excruciating suffering, under a complication of dreadful maladies, which he bore with exemplary fortitude and resignation.

Philip II. was four times married. The queen of England, by whom he had no issue, was his second wife. His first was his cousin, Mary of Portugal; and by her he had one son, Don Carlos, whose fate has deepened the sombre aspect of his reign. That young prince, who appears to have been of a haughty and violent temper, was exasperated by his father's refusal to admit him to a share in the administration of the kingdom, though he had never shown any capacity for public affairs. After giving many proofs of a discontented and disordered mind, he was, on an accusation of holding a treasonable correspondence with the Flemish insurgents, arrested in his bed by Philip himself, at midnight on the 18th of January, 1568, and committed to a prison, where in a few months he terminated his miserable existence, at the age of twenty-three years, and not without the horrid suspicion that his death had been hastened, through poison or other means, by his father's command. But the authentic version, which we have related, of this mysterious and tragical affair has been variously discoloured by calumny and fiction. Writers, who believed or feigned Philip capable of any atrocity, have asserted without sufficient evidence that he was the murderer of his son; and upon this foundation has the superstructure been formed for a romantic tale of a mutual and criminal passion between Don Carlos and his father's third wife, the Princess Elizabeth of France, who had originally been betrothed to himself, and whose life, which closed quickly afterwards, is also said to have been sacrificed to the jealous vengeance of her husband. For this charge against all the parties, there seems however to have been no foundation. By Elizabeth, Philip had two daughters, who, together with his son and successor by his fourth wife Anne, daughter of the emperor Maximilian II., were the only legitimate issue which he left. In the midst of his persecuting zeal, he had given one purer proof of his regard for religion; and sacred literature owes an obligation to his memory for the publication of the beautiful Polyglot Bible which bears his name, and which was printed at Antwerp in 1569-72, in 8 volumes, folio.

PHILIP III. was a prince, in everything except the bigotry of his faith, of a character most opposite to that of his father. Gentle, humane, and unconquerably indolent, he surrendered himself and the whole management of his affairs, from the very commencement of his reign, to the guidance of his favourite, the marquis of Denia, who had been his chief equerry, and whom he raised to the dignity of duke of Lerma. This nobleman, who governed Spain as prime minister with unbounded power for twenty years, was a personage of dignified mien and of a mild and beneficent disposition; but as a statesman, though he wanted neither prudence nor firmness of spirit, he was otherwise of only moderate capacity, and he rendered his administration injurious to the state by his love of pomp and lavish expenditure, and the consequent derangement of the national finances. He was supplanted at last in the affections of his feeble master (A.D. 1618) by his own ungrateful son, the duke of Uzeda, under whom the kingdom was not better governed; and the aged Lerma was solaced by the pope in his unmerited disgrace with a cardinal's hat, which he had used the foresight to solicit a little before his fall, as a protection from the persecution of his enemies.

The principal circumstances which distinguished the reign of Philip III. were the recognition of the independence of the revolted provinces in the Low Countries, and the expulsion of the Moors from Spain. Notwithstanding the cession by Philip II. of the general sovereignty of all the Netherlands to his daughter Isabella and her husband the archduke Albert, which was ratified by Philip III. immediately after he ascended the throne, the war in those provinces continued with unabated fury, and with indifferent success to the Spanish arms, until the year 1609; when the exhaustion of the immense revenues of the monarchy compelled the duke of Lerma to conclude in his master's name a truce for twelve years with the Seven United Provinces, by which the king of Spain acknowledged them for free and independent states. In the same year, under the plea that the remains of the Moorish population in Spain, notwithstanding their pretended conversion to Christianity, continued in their hearts to be obstinate infidels, and to hold treasonable correspondence with their African brethren, a royal edict was issued, commanding all the Moors in the kingdom of Valencia to quit the Spanish dominions; and soon after a decree, extending this sentence of banishment to all the Moors in the peninsula, completed (A.D. 1610) the fatal measure, from which Spain has never recovered. On the impulse of a blind superstition, and contrary to every dictate of wise policy, above a million of the most industrious subjects of the Spanish crown were driven into exile; and the most flourishing provinces were depopulated by their removal to the opposite shores of Barbary. [MORISCOES.]

After these events Spain may be said to have languished, rather than found refreshment, in peace, which was interrupted but slightly, by the commotions of the times in Italy and Germany, during the remainder of the reign of Philip. That prince terminated his existence by a fever in the year 1621, at the age of forty-three years. By his queen, Margaret of Austria, he left three sons: Philip, who succeeded him; Charles, who died in 1632; and Ferdinand, for whom, at the age of only ten years, he obtained from the pope a cardinal's hat, with a dispensation to hold by proxy the archbishopric of Toledo, and who, in consequence of these ecclesiastical dignities, is known in history under the title of the cardinal-infant. Of his daughters, the eldest, Anne, married Louis XIII. of France; and the second, Maria Anne, after having been contracted to Charles I. of England, when prince of Wales, was finally married to the king of Hungary, who subsequently ascended the Imperial throne under the title of Ferdinand III.

PHILIP IV. was only sixteen years of age when he ascended the throne; and, like his father, after he had become the sovereign of his people, he remained the subject of a favourite. This was the famous count-duke Olivarez, by which peculiar title he chose to be styled, a man of self-sufficient confidence and inordinate ambition, who affecting to condemn the supine inactivity of the last reign, and to pursue a more vigorous course of policy, concluded for his sovereign with the emperor a strict family league for the aggrandisement of both branches of the House of Austria. The means proposed for this object were the renewal of the war in the Low Countries at the expiration of the twelve years' truce, and the consolidation of the Spanish power both in these provinces and in Italy; while in Germany the Imperial authority should be secured by the subjugation of the Protestants. It was hoped that France, torn by religious wars, could offer no resistance to these designs; and England was to be amused with that matrimonial treaty which produced the strange journey of Prince Charles, attended by the duke of Buckingham, to woo the infanta Maria Anne at Madrid.

These intrigues were among the preludes to the long and sanguinary wars which were only terminated in Germany by the peace of Westphalia, and which continued between Spain and France above ten years later, until the treaty of the Pyrenees. In the Netherlands, during the life of the renowned Spinola, the Spanish arms long maintained an ascendant: but in the maritime war which extended to the New World, the Dutch fleets were everywhere victorious over those of Spain; and the policy of Olivarez drew upon his country the temporary assaults of England as well as the more lasting hostilities of France. Directed by the genius of Richelieu, the energies of that monarchy were ably and successfully applied to humble the power of the House of Austria; and the ambitious projects of foreign dominion, which Olivarez had built up, crumbled one after another to the ground.

Meanwhile a dangerous insurrection in Catalonia, provoked by the imprudent measures of that minister, and the revolt of Portugal (A.D. 1640), were added to the distresses of the Spanish monarchy. Olivarez announced this last event to his master as a subject of congratulation: 'Sire, the duke of Braganza has had the madness to suffer himself to be proclaimed king of Portugal. His imprudence will bring a confiscation of twelve millions into your treasury.' Portugal was irrevocably lost by mismanagement and defeat to the Spanish crown; but Catalonia, after a desperate struggle of many years, was finally reduced to obedience. Olivarez, whom Philip IV. was himself at last compelled to recognise as the cause of these multiplied disasters, was disgraced in 1647, and was succeeded as prime minister by his nephew Don Louis de Haro, who however was neither attached to him nor disposed to imitate his measures.

In the following year (A.D. 1648) was concluded the peace of Westphalia, by which Philip IV., for himself and his successors, finally and formally renounced all claim of sovereignty over the Seven United Provinces. The war with France, which still continued for eleven years, and the reverses of which were increased by the league of England, under the protectorate of Cromwell, with France, was little else than one long train of loss and disgrace to Spain; and the peace of the Pyrenees (A.D. 1659), which closed the struggle, was only obtained by territorial sacrifices.

This treaty was also distinguished by the marriage of Maria Theresa, eldest daughter of Philip IV., to Louis XIV. of France, an event which, despite of the solemn renunciation of the French king, was destined to convey the crown of Spain to the house of Bourbon. After this pacification Philip continued his vain efforts to recover the crown of Portugal for some years; and his death, which occurred in 1665, is said to have been hastened through grief at the continued defeat of his troops by the Portuguese. He was a prince of some talents, and of upright intentions: but a propensity to pleasure, which Olivarez had artfully encouraged, immersed him in indolence; and these habits enervated his understanding and rendered him incapable of applying to business. He left one son, who succeeded him under the title of Charles II., and died childless; and two daughters, Maria Theresa, married to Louis XIV., and Margaret Theresa, who became the wife of the emperor Leopold.

PHILIP V., king of Spain, was great-grandson of Philip IV., through his daughter Maria Theresa, grandson of Louis XIV. of France, and second son of the dauphin. He was born in 1683, received the title of duke of Anjou in his infancy, and was called by the last testament of Charles II. to the throne of Spain and the Indies in the the year 1700. The circumstances which attended this inheritance, and produced the memorable war of the Spanish succession, belong more appropriately to the reign of his grandfather [LOUIS XIV.]; and it will suffice in this place to sketch the principal events of his life after his recognition as king of Spain by the treaty of Utrecht (A.D. 1713). He had married, two years before, Maria Louisa, a princess of Savoy, to whom he became so tenderly attached that on her death (A.D. 1714) he abandoned for a time all care of business, and resigned himself to the guidance of the celebrated princess Des Ursins, a French woman of spirit and intelligence, the favourite of the deceased queen, who had accompanied her into Spain from Italy, and retained equal influence after her death on the mind of Philip. He desired to follow her advice in the choice of a second consort, and she was induced by Alberoni, an Italian priest, to select for his queen Elizabeth Farnese, daughter of the duke of Parma. But the new queen proved of a very different character from that which Alberoni had artfully ascribed to her; and instead of exhibiting the pliant temper and feeble mind which the princess Des Ursins had been taught to expect and reckoned upon governing, her first act was to cause the astonished favourite to be sent out of the kingdom.

Alberoni succeeded immediately to the influence of the discarded princess; was shortly appointed prime minister; and soon obtained from the pope the dignity of cardinal. This man, in whose mind there was much that was uncommon, and something of grandeur, had conceived the design of restoring Spain to her rank and power among nations. He began by the attempt to recover for her the Italian provinces, which had been lost by the treaty of Utrecht: but this, though only a part of the vast schemes which he had formed, was sufficient to alarm the leading powers of Europe; and it produced the quadruple alliance of England, France, the Empire, and Holland (A.D. 1718), which Spain was unable to withstand. Philip yielded to the demands of the allies by disgracing and banishing Alberoni, under the prudence and vigour of whose brief domestic administration agriculture and commerce had already begun to revive in Spain. A few years later, Philip, who, though not without some talents, was of a weak and melancholy disposition, abdicated his crown in favour of his son Louis (A.D. 1724), and retired with his queen to a religious seclusion at St. Ildefonso. But on the death of Louis, who, in a few months after his accession, fell a victim to the small-pox, Philip found himself compelled to resume the toils of government.

The period of his second reign, which was protracted for twenty-two years after his son's death, was occupied chiefly in obtaining possessions in Italy for his two sons by his ambitious queen Elizabeth Farnese, both of whom she succeeded in establishing in that country, Don Carlos as king of the Two Sicilies, and Don Philip as duke of Parma and Piacenza. In other respects the transactions of this long reign present nothing remarkable which does not belong to the general history of Europe rather than to that of Spain; and Philip died in 1746, leaving an only surviving son by his first wife, who succeeded him under the title of Ferdinand VI., and a numerous family by his second queen, one of whom, Don Carlos, afterwards ascended the Spanish throne as Charles III.

(For these reigns of the five Philips of Spain we have consulted *L'Art de vérifier les Dates*; the *Universal History* (vols. xvii., xviii.); Schiller, *Geschichte des Abfalls der Niederlande*; Watson, *History of the Reigns of Philip II. and Philip III.*; Coxe, *Memoirs of the Kings of Spain of the House of Bourbon*, &c.)

PHILIP OF ORLEANS, Regent. [ORLEANS, HOUSE OF.]

PHILIPPE I., king of France, son of Henri I., and third both in descent and succession from Hugues Capet, founder of the third dynasty of France, was born A.D. 1053, and succeeded his father A.D. 1060. His mother was Anne of Russia, daughter of the Czar Jaroslaf I. On his deathbed, Henri committed the care of the child and the administration of the government to his brother-in-law, Baudouin or Baldwin, count of Flanders. Baudouin did little more till the time of his death (A.D. 1067) than occasionally visit his ward, who was brought up sometimes at Paris, sometimes at one or other of the royal castles. The death of Baudouin removed from Philippe the restraint which his station and inexperience required, and he plunged into a series of excesses of the most disgraceful character. The means of indulgence were supplied from various sources, especially from the sale of ecclesiastical benefices and dignities, which subsequently drew upon him the hostility of the church, but although he had not sufficient energy vigorously to struggle against the growing spirit of ecclesiastical domination, his necessities and his profligacy prevented his entire submission to the claims of the popes, who desired to engross to themselves all the higher ecclesiastical appointments. Philippe was engaged, not long after the death of Baudouin, in a war with Robert le Frison, or the Frisian, who had usurped the county of Flanders from his nephew Arnolphe, the grandson of Baudouin. The hasty and inadequate force assembled by Philippe was surprised and routed by Robert near Cassel: the young Count Arnolphe was killed, and the king only saved himself by a hasty and inglorious flight (A.D. 1071). In a second attempt to subdue Robert, Philippe met with no better success. He then made peace with him, and married Bertha of Holland, his step-daughter.

From 1075 to 1087, Philippe was engaged in occasional hostilities with Guillaume, or William, duke of Normandie, and king of England, which kingdom he had acquired by conquest (in 1066) during Philippe's minority. But the war was languidly conducted, on the part of Philippe from indolence, and on that of William from full occupation in other quarters, and perhaps from the feudal sentiment of respect for his suzerain. Philippe however encouraged the discontented vassals and rebellious children of William; and the contest did not finally terminate until the death of the Conqueror (A.D. 1087). He had become excessively corpulent, and a coarse jest of Philippe, who inquired 'when he would be put to bed,' excited his indignation. 'When I go to be churched at St. Géneviève, I will offer a hundred thousand tapers,' was the reply of the angry veteran. He entered the territory of Vexin, and stormed Mantes; but a hurt which he received by his horse falling proved mortal, and relieved Philippe from his hostility.

The year 1092 was marked by the most important incident of Philippe's life. He had become weary of his wife Bertha, by whom he had four children, and had confined her in the castle of Montreuil, which had been settled on her by way of dower. He now married Bertrade, wife of Foulques le Rechin, count of Anjou, who, dreading her husband's inconstancy, forsook him and took refuge with Philippe. This marriage was so glaringly inconsistent, not only with good morals and decency, but with ecclesiastical law, that it was with difficulty that any bishop could be procured to solemnise the union. It involved Philippe in two wars, one with Robert le Frison, who took up the cause of the repudiated Bertha; and another with Foulques of Anjou, who sought to recover Bertrade. The church also took up the matter, and Philippe was daily attacked with remonstrances, censures, and threats of excommunication. In return he threatened the bishops, and even subjected one of them to a short imprisonment. Philippe had obstinacy enough to retain Bertrade, but not sufficient strength of character to silence the bishops. Some of them indeed embraced his cause, after the death of his injured wife Bertha (A.D. 1094), and, in a council held at Reims, showed a disposition to attack the bishop of Chartres, his sturdiest opponent. But the majority of the French bishops, in a national council at Autun, excommunicated both Philippe and Bertrade (A.D. 1094). The pope, Urban II., despising his weakness, thought it not necessary to pursue him to extremity, and the sentence was only so far enforced as to deprive him of the liberty of wearing the ensigns of royalty, and to prevent the celebration of public worship in the place where he was. He retained the exercise of such power as he possessed, and was allowed to perform his devotions in his private chapel.

Near the close of the eleventh or the beginning of the twelfth century, Philippe, being engaged in hostilities with William II., the Red, who then held Normandie, associated with himself in the honours and powers of royalty his son Louis VI., then only eighteen or twenty years of age, afterwards known as Louis le Gros. The activity and good conduct of the prince gradually raised the royal power from the contempt into which it had fallen, but excited the jealousy of his step-mother Bertrade. The court was divided; Louis is charged with seeking a pretext to have Bertrade murdered, and Bertrade practised on his life by poison. Neither the divisions of his family nor the power of the church could prevail on Philippe really to put away Bertrade, or to deprive her of the title of queen. A declaration of penitence, an engagement no longer to regard her or live with her as a wife, which engagement he afterwards openly violated, were accepted by the church, and the excommunication was taken off (A.D. 1104). Bertrade afterwards succeeded in reconciling both herself and Philippe with her former husband, Foulques le Rechin, and the degrading intercourse of the two husbands of this infamous woman is described by Sismondi after Orderic Vitalis. The remaining years of Philippe were marked by little except the intrigues of Bertrade for the advancement of her children by both marriages. In 1106, Constance, daughter of Philippe by his first wife, married Boemond, or Bohemond, the Norman, prince of Antioch, who had come to France in discharge of a vow, and to raise recruits for the Holy Land.

Philippe died at Melun, of premature old age, the result of his intemperance, A.D. 1108, having nearly completed the forty-eighth year of his reign, and was succeeded by Louis VI. His worthless character, combined with the low state of the regal power, rendered him a spectator rather than an actor in the events of his reign. France possessed at this time little national unity, and the history of the time is the history of the great nobles and of the provinces, rather than the history of the king or the kingdom. From the time of Philippe the royal power revived. The activity of Louis had given an impulse to it even in his father's time, and his activity and that of his immediate successors gave permanence to the movement.

PHILIPPE II., better known as **PHILIPPE AUGUSTE** (a name which he is thought to have derived from being born in the month of August), was the son of Louis VII., surnamed Le Jeune, or the Young, and Alix, daughter of Thibaut le Grand, count of Champagne, his third wife. He was born A.D. 1165, and was crowned at Reims, when little more than fourteen years of age, in his father's lifetime, upon whose death, in the following year (A.D. 1180), he came to the throne. He had however exercised the sovereign power from his first coronation, his father being disabled by palsy, and one of his earliest acts was a general persecution of the Jews, whom, when assembled in their synagogues on the Sabbath, he caused to be surrounded by soldiers, dragged to prison, and despoiled of all the gold and silver that was found on them. He also published an edict, by which all debts due to them were to be annulled on condition that the debtor should pay to the royal treasury a fifth part of the amount due. Other acts of persecution followed, and in 1181, the Jews were commanded to dispose of all their moveable property and quit the kingdom for ever; all their real property was confiscated to the crown, and their synagogues were ordered to be converted into Christian churches. The intercession both of nobles and ecclesiastics, for whose good offices they paid large sums, was in vain; and after experiencing a heavy loss from the enforced sale of their effects, they were expelled from all the domains of the crown. The great vassals of the crown were in no hurry to repeat the royal edict, and in the county of Toulouse especially the Jews remained undisturbed. Other acts of persecution followed, and the king is recorded 'not to have allowed to live in all his kingdom a single individual who ventured to gainsay the laws of the church, or to depart from one of the articles of the Catholic faith, or to deny the sacraments.'

The pride and ambition of Philippe led him, even before his father's death, to embroil himself with the queen his mother and her four brothers, the counts of Blois, Champagne, and Sancerre, and the archbishop of Reims, who had taken advantage of the weakness of Louis VII. to govern France in his name, and who concluded that it belonged to them to direct the administration of a minor king. The good offices of Henry II. of England arranged the dispute. Philippe married, before his father's death, Isabelle, niece of the count of Flanders, his godfather; and was, with her, crowned a second time at St. Denis, by the archbishop of Sens. This marriage was one of the causes of dispute with his mother and uncles. He soon alienated the count of Flanders, as well as most of the other great vassals of the crown, who united to oppose his rising power; but the good offices of Henry of England again restored quiet (A.D. 1182). It was a little after this that he caused some of the streets of Paris to be paved. [Paris.] After an interval of three years (A.D. 1185), war between Philippe and the count of Flanders again broke out, and ended, after a short campaign, by a peace which added to the territory and resources of the king. A struggle with the duke of Bourgogne (A.D. 1186) also terminated favourably for the king. Hostilities with Henry II. of England followed, and were attended with success; and that powerful monarch, broken-hearted at seeing his own sons in league with his enemy, died at Chinon (A.D. 1189).

In A.D. 1188 Philippe had taken the cross. In 1190 the combined forces of Philippe and Richard I. of England rendezvoused at Vezelay, not far from Auxerre; and in the autumn of the same year they embarked, Philippe at Genoa, and Richard at Marseille. They met and wintered at Messina in Sicily, and in 1191 proceeded to the Holy Land; but before long, Philippe, jealous of the superiority of Richard as a warrior, made ill health an excuse for returning to France, and reached Paris in December, 1191. He had left his mother Alix, and his uncle, the archbishop of Reims, regents of his kingdom. The incidents of the crusade had made Philippe and Richard rivals; and the former, on his return, commenced his attack on the other, at first by intrigues, and afterwards by force. He made some acquisitions in Normandie, but failed (A.D. 1194) in attacking Rouen. The following years were occupied with alternate periods of truce and hostility, in which the policy and steadiness and the feudal superiority of the French king rendered him a match for the more soldier-like qualities of Richard; and on the death of Richard (A.D. 1199), the incapacity of John, his successor, enabled Philippe to establish decisively the superiority of the Capet race over the rival family of Plantagenet. During this war, Philippe, now a widower, married Ingeburge, or Isamburge, sister of Canute VI., king of Denmark (A.D. 1193); but having in a short time obtained a divorce in an assembly of prelates and barons, he married Marie, or Agnes, daughter of Berchtold, duke of Merania, a German noble (A.D. 1196), in contempt of the authority of the pope, before whom the case of Ingeburge had been carried, and by whom the divorce had been annulled. The struggle between the king and the pope (Innocent III.) continued for some years, until an interdict laid on Philippe's dominions obliged the king to submit the affair to an ecclesiastical council at Soissons (A.D. 1201); but he evaded their decision by a pretended reconciliation with his queen Ingeburge, whose real condition was however little improved. Marie of Merania, from whom he had been obliged to separate himself, died soon after, leaving two children, whom the pope did not scruple to declare legitimate.

The murder of Arthur of Bretagne, by his uncle John of England, having roused general indignation, Philippe seized the occasion to attack Guienne, Normandie, Touraine, Anjou, and Poitou. These, except Guienne, he speedily conquered; and prosecuting John before the court of the twelve peers of France, by a sentence quite unprecedented in France and unauthorised in such a case by the institutions of feudalism, procured the confiscation of all his French dominions (A.D. 1205). Crimes, however flagrant, which did not violate the duty of the noble to his feudal superior, had not hitherto been cognizable in the great feudatories; and the Court of Peers, which Philippe professed to revive from the institutions of Charlemagne, was probably an innovation, founded on romances to which the ignorance of the age gave the credit of being faithful historical traditions. It consisted of twelve members, viz.: six of the great nobles (the dukes of Normandie, Bourgogne, and Aquitaine; and the counts of Toulouse, Flanders, and Vermandois, for the last of whom the count of Champagne was substituted), and six prelates, by means of whom the king sought to influence the decisions of the tribunal. As in judgments involving a capital sentence the ecclesiastics could not take part, it is probable that the number of twelve was made up out of the higher nobility who were at court at the time. The nobles forming the court, proud of sitting in judgment on a crowned head, lent themselves to the purpose of Philippe, who met with no opposition in thus establishing a jurisdiction which might hereafter promote the aggrandisement of the crown. John succeeded in preserving Guienne and recovering Poitou and part of Touraine; but Normandie, and his other dominions to the north of the Loire were finally lost.

In the interval of peace which followed, Philippe endeavoured to consolidate the institutions of his kingdom by holding national assemblies; but his authority in the south of France, where the crusade against the Albigeois was about this time (A.D. 1207, 1213) carried on, continued to be merely nominal. He embellished Paris, protected the university of that city, and sought the favour of the church by sending to the stake those charged with heresy. Under pretence of supporting the cause of the church against John of England, Philippe prepared for the invasion of that kingdom; and when John had submitted to the church, under the protection of which he placed himself, Philippe turned his arms against Flanders, the count of which had refused to join in the invasion of England. He obliged the chief towns to surrender, and committed great ravages; but lost his fleet, part of which was taken by the English, and the rest burnt in the port of Dam to prevent its falling into their hands (A.D. 1213). Next year Philippe was attacked on the side of Poitou by John, and on that of Flanders by the Flemish nobles and burghers, supported by the emperor Otho IV.; but John was repelled by Louis, the son of Philippe; and the emperor, whose army consisted almost entirely of Flemings, was defeated by Philippe himself at Bouvines, between Lille and Tournay (A.D. 1214).

In 1216, Louis, son of Philippe, went over to England, whither he was invited by the malcontent barons; but he was obliged to return the next year. In 1219 he took part in the crusade against the Albigeois; and was afterwards (A.D. 1221) engaged in hostilities in the provinces held by the English king Henry III. The Count of Montfort, unable to retain the conquests which his father, Simon de Montfort, had made in the county of Toulouse [Languedoc], offered to cede them all to Philippe Auguste; but the king, who had never taken much interest in the affairs of the south, declined engaging in the negotiation. The feebleness of his health increased the natural caution of age, and he took little part in the affairs of foreign lands. He employed himself chiefly in strengthening and improving the domains of the crown, which he had so widely extended; and he walled in the towns and villages which it comprehended. His regular management of his revenues enabled him to effect this, and yet to bequeath to his various legatees an immense sum, of which the maxims of the time enabled him to dispose as if it had been his own property. He died at Mantes, A.D. 1223, in the fifty-eighth year of his age, having reigned forty-three years.

PHILIPPE III., surnamed **LE HARDI**, or the Bold, was the eldest son of Louis IX. (or St. Louis). He was born in May, A.D. 1245; and was proclaimed king in the camp before Tunis, which city his father was besieging at the time of his death, August, A.D. 1270. The army remained yet two months in Africa, suffering much from the climate: at length peace was made with the king of Tunis; and part of the besiegers determined to proceed with Alphonse, count of Poitou and Toulouse, the king's uncle, to the Holy Land; another part with Charles of Anjou, another of his uncles, for Constantinople; while the remainder, under Philippe himself, were to return to France. Before their final separation, the division destined for the Holy Land was shattered by a tempest, and many vessels were lost. The expeditions to the Holy Land and to Constantinople were consequently given up, except by an auxiliary division of English, which proceeded under Prince Edward (afterwards Edward I.) to Acre; and the wreck of the army, diminished by sickness, proceeded with Philippe to France. His father and one of his brothers had died at Tunis, and he lost, on his way through Sicily and Italy, his brother-in-law, the king of Navarre, through disease, and his wife, Isabella of Aragon, who died through premature childbirth, the consequence of a fall. It was not till May 21st, 1271, that he reached Paris. He was crowned at Reims in the following August, and shortly after, by the death of his uncle Alphonse, acquired the counties of Poitiers and Toulouse, which that prince had possessed.

It was the object of Philippe to render the great feudal nobles more completely subject to his sceptre, and he reduced to subjection the count of Foix, who had refused obedience to his commands (A.D. 1272). He married (A.D. 1274) Marie, daughter of the duke of Brabant, who was crowned as queen the following year. He interfered in the affairs of Navarre, during the minority of his kinswoman Jeanne, heiress of that kingdom, who was designed to be married to one of his sons; and in the affairs of Castile, to support the claims of the Infants of La Cerda, his sister's children, and heirs in the direct line to that kingdom, whom the Cortes had set aside in favour of Sanchez, their maternal uncle. He succeeded in retaining Navarre for some years, but his projects in Castile failed of success.

During the earlier years of his reign Philippe was much under the influence of Pierre de la Brosse, who had commenced his career at court as barber-surgeon to Saint Louis, and had risen to the rank of chamberlain. His elevation, and the abuse, real or supposed, of his influence over the king, caused his downfal; he was arrested (A.D. 1278), tried on some charge never promulgated, before a commission of nobles, condemned to be hung, and executed in pursuance of his sentence. The immediate cause of his downfal is supposed to have been his inspiring Philippe with a suspicion that his Queen, Marie of Brabant, had poisoned her step-son Louis, Philippe's eldest son by his first wife, in order to open a way for her own children to the succession.

In 1283 Philippe engaged in war with Pedro, king of Aragon; the crown of which kingdom had been offered by the pope (who had excommuncated Pedro) to Charles of Valois, Philippe's second son, to be held in feudal subjection to the holy see. The French king assembled his barons and prelates to deliberate on the matter, and by their advice accepted the pope's offer. The prelates and nobles formed on this occasion two separate chambers. In 1285 he invaded Catalonia, took the town of Elna by assault and massacred the inhabitants, compelled Rosas and Figueras to submit, fought an indecisive battle at Hostalrich, and took Gerona by capitulation. But the long siege and severe loss which this last-mentioned town had cost him, the superiority of the Aragonese and Sicilians by sea, and the wasting of his army by disease, compelled him to commence a retreat, which he did not effect without considerable loss. Philippe was himself seized by the disease which had wasted his army, and died, on his return to France, at Perpignan, 5th October, A.D. 1285.

PHILIPPE IV., better known as **PHILIPPE LE BEL**, son of Philippe le Hardi, by his first wife, Isabella of Aragon, was born A.D. 1268; and succeeded his father on the throne of France, October, A.D. 1285, having previously acquired, in right of his wife Jeanne, the crown of Navarre. He was crowned at Reims, January, 1286. The war with Aragon continued, but was carried on languidly. The young king gave, from the first, his confidence to the lawyers, who were gradually working the overthrow of the feudal system, and giving consistency and stability to a system of jurisprudence favourable to despotism; they flattered him, by describing his power as absolute; and inspired him with mistrust both of the dignified clergy and of the nobles, whom they looked upon as rival classes to themselves. It is likely that in the earlier period of his reign he indulged the love of luxury and refinement then prevalent; though this appears, not from direct testimony, but from his continual poverty, In 1290 he despoiled the Jews; and in 1291 he ordered the Italian merchants, who engrossed nearly all the commerce of his kingdom, to be imprisoned; and by the apprehensions of further violence, with which he inspired them, induced them to ransom themselves by heavy payments. Most of them speedily quitted the kingdom. Two brothers, Florentines, Biccio and Musciatto Franzesi, are supposed to have prompted Philippe to this deed of violence and injustice, by which they not only filled the king's coffers, but acquired for themselves the monopoly of the French markets. The success of these experiments encouraged the king to make the lawyers the instruments of his exactions; his policy in fact nearly resembled that pursued at a later period by our own Henry VII.; and had a like effect in amassing wealth and in depressing the power of the nobility.

In 1290 Philippe paid a visit to the south of France, in order to form with his allies a plan of combined operations against Aragon, to confirm his authority over his remote vassals at the foot of the Pyrenees, and to gain the affections of the nobles of Guienne, then subject to Edward I. of England, of whom Philippe began to be jealous. In 1291 he proposed to renew the attack upon Aragon, refusing to ratify the treaty which had been concluded by the other belligerent parties at Tarascon in the early part of the year: but the proposal was probably a mere feint to raise money. In this point too the policy of Philippe bears a close resemblance to that of Henry VII.

In 1292 a quarrel between some English and Norman sailors at Bayonne, followed by mutual hostilities between the vessels of the Cinque Ports and France, ripened the jealousy of Philippe into determined hostility to Edward. He summoned the latter, under certain penalties, to appear before the parliament at Paris (A.D. 1293), to answer for the hostilities committed by his vassals; and Edward, observant of his subordination as a vassal of the king of France, obeyed the summons by sending his brother Edmond to appear for him (A.D. 1294). Anxious to avoid a continental war, he consented to deliver up six towns in Guienne to commissioners appointed by Philippe; and to surrender twenty of the persons most deeply implicated in the previous hostilities, to take their trial before the parliament of Paris. Instead of six towns, Philippe caused the whole of Guienne to be occupied by an armed force; and when he had thus obtained possession, he charged Edward with contumacy, and cited him again before the parliament, under heavier penalties for non-appearance than before. Enraged at being thus outwitted, the English monarch renounced his allegiance, sent an army to recover Guienne (A.D. 1295), and formed alliances with various continental princes against Philippe. But the war was languidly carried on, for Edward's attention was engrossed by Scottish affairs, and his continental allies made few efforts, except the Flemings, who were unfortunate. Hostilities were terminated by a truce of indefinite length, and by the arrangement of some matrimonial alliances between the two royal houses, concluded by the mediation of the pope Boniface VIII. (A.D. 1298.) By the terms of this truce, part of Guienne was restored to Edward, but the final adjudication of that great fief was reserved for the future decision of the pope. The expenses of this war increased the necessities of Philippe, and these led him into disputes with the clergy and the pope, and made him persecute the Jews in order to extort from them a portion of their wealth. One beneficial result sprang from his desire of money—he emancipated the serfs of Languedoc, commuting his rights over them for a pecuniary payment.

Philippe was anxious to avenge himself on the princes who had allied themselves with Edward. The defeat and death of Adolphus of Nassau, king of the Romans, may be ascribed to his intrigues (A.D. 1298). The count of Flanders was imprisoned and his county seized; but the oppressions of the French caused a revolt of the Flemings, in attempting to suppress which the French suffered a complete defeat at Courtrai (A.D. 1302). Philippe advanced next year into Flanders with a vast army, but effected nothing; and in order to have his hands free for this war, and for a dispute with the pope, which he had been long carrying on, he made a definitive peace with Edward of England, to whom he restored the whole of Guienne (A.D. 1303). He advanced into Flanders, defeated the Flemings both by sea and land (A.D. 1304), but found still so obstinate a resistance, that he made peace, contenting himself with the cession of a small part of the country, and conceding the independence of the rest. The pope had meanwhile been seized by Nogaret, Philippe's envoy at Anagni; and though released by the populace, had died about a month after of a fever, the result probably of the agitation to which he had been exposed. (A.D. 1303.) Benedict XI., who succeeded him, lived but a short time, and on his death the pontificate came to Clement V. (A.D. 1305). The exactions and the depreciation of the coinage, by which Philippe provided resources for the Flemish war, provoked discontent in various parts of his dominions, which he endeavoured to suppress by merciless severity. The seizure and banishment of the Jews of Languedoc, and the confiscation of their property, was another of the measures to which he had recourse at this time (A.D. 1306).

Among the methods which Philippe employed to fill his exchequer, the depreciation of the coinage had been one of the most usual. He had paid in this depreciated coinage the sums he had borrowed in a currency three times more valuable. When however he found that his plan began to tell against himself, his revenues being paid in the depreciated coinage, he found it necessary to correct the abuse, and to issue money equal in value to that of previous reigns. This however caused fresh disturbances; debts contracted in the depreciated money had now to be paid in the new and more valuable coinage; and this hardship led to commotions, which Philippe repressed with atrocious cruelty. He found it necessary however to publish some new edicts, in order to remedy the evil complained of (A.D. 1305). In order to conciliate the nobility, whose alliance he wished to make a counterpoise to the popular discontent, Philippe restored the practice of judicial combat in all heavier accusations against the nobility.

It was probably the desire of Philippe to obtain their wealth, that led to the suppression of the great military order of the Templars. They were accused of crimes the most revolting by two worthless members of their own order; and Philippe gave secret orders for the arrest of all who were in France; and these orders were executed in all parts of his dominions at the same time. The trials were carried on before diocesan tribunals; and though the pope (who was a creature of Philippe) at first claimed for himself the investigation of charges affecting an ecclesiastical body, he gave up the point, reserving to himself only the trial of the grand-master and a few other chief men. The judges were eager to convict the accused: confessions were wrung from many by torture; numbers were brought to the stake for denying the confessions thus extorted; others were condemned to various inferior penalties. The persecution became general in Europe, but out of France the Templars were generally acquitted of the charges brought against them. The pope however, at the instance of a council assembled at Vienne, suppressed the order by virtue of his papal authority, and granted their possessions to the Hospitallers (A.D. 1311). But Philippe and his nobles had already seized their French possessions, and the Hospitallers were obliged to redeem them with heavy payments. Jacques de Molay, grand-master of the Templars, and the commander of Normandie, were burnt at Paris for retracting their confessions (A.D. 1314).

The last years of Philippe's reign were signalised by these infamous proceedings. He managed about the same time (A.D. 1310) to gain possession of Lyon, which had previously enjoyed a considerable degree of independence, though nominally subject to the empire. [Lyon] He also interfered as mediator (A.D. 1313) between Edward II. of England, who had married his daughter Isabelle, and the discontented barons of that kingdom. His necessities induced him to persecute afresh the Jews and the Lombard merchants; and his severe and suspicious temper led him to reiterated cruelties. The wives of his three sons were charged with adultery, and two of them were declared guilty, and condemned to imprisonment; while their lovers, and those who were supposed to have aided in their crimes, were put to death by the most horrid tortures. The wife of Philippe, count of Poitiers, his second son, was acquitted (A.D. 1314).

Philippe le Bel died at Fontainebleau, from the effect of an accidental fall while hunting, 29th of November, 1314, in the thirtieth year of his reign, and the forty-sixth of his age.

It was in the reign of Philippe le Bel that the *Tiers Etat*, or commons, were admitted for the first time to take part in the national assemblies subsequently designated *les Etats Généraux*, or *States-General*. They were present at a council held (A.D. 1302) on occasion of Philippe's dispute with the pope Boniface VIII. It was in this reign also that the sittings of the parliament, the supreme justiciary court, into which, by the substitution of the lawyers for the nobles, the antient Cour de Pairs [Philippe II.] had been transformed, became fixed at Paris.

PHILIPPE V., known as **PHILIPPE LE LONG**, the second son of Philippe IV., or 'Le Bel,' was born A.D. 1294, and succeeded to the throne A.D. 1316. His elder brother, Louis X., or Louis le Hutin, had died 5th of June, 1316, leaving by his first wife a daughter, who succeeded him on the throne of Navarre, and his queen, who was his second wife, pregnant. On the news of his brother's death, Philippe, who was at Lyon, where the conclave of cardinals were engaged in the election of a pope, hastened to Paris, and assumed the government, which was confirmed to him by the barons of the kingdom, who were assembled for the purpose, until the birth of the child, of which the widowed queen was then pregnant. If she produced a son, he was to retain the government as regent during the minority of the child; if a daughter, he was to be recognised as king. The child, which was a boy, died a few days after birth (November, 1316), and Philippe assumed the sovereignty in full right, and was crowned at Reims, Jan. 9th, 1317.

It was upon this occasion that the Salic law, by which females were excluded from the succession to the throne, was established as a constitutional law in France. Louis X. had left a daughter, Jeanne, queen of Navarre; and there appears to have been no just ground, either from precedent or from the analogy of the laws of succession which prevailed in other kingdoms, or in the great fiefs, for her exclusion. The ground urged by the legal supporters of Philippe's claim was an antient law excluding females from the succession to the Salic lands, a peculiar species of allodial possessions, but which law could only by a remote analogy be made to bear on the succession to the throne. The case of a sole heiress to the crown had not however occurred before; and if there was no precedent for the exclusion of a female, there was no instance of one having really occupied the throne. Jeanne was, besides, a female and a minor: the duke of Bourgogne, her maternal uncle, who was her natural supporter, was induced to surrender her claim; the States-General, being convoked, confirmed the title of Philippe; and the death of his only son induced his brother Charles to assent to it, in the hope of turning against Philippe's own daughters the law of which he was desirous to avail himself to the exclusion of his niece. The Salic law was thus firmly established as the fundamental law of succession in the French monarchy.

The States-General were assembled three times in this reign; first to confirm Philippe's title to the throne, then to regulate the finances, and lastly for a general reform of abuses. In the first of these assemblies Philippe issued an edict, giving a military organization to the communes, though he was subsequently obliged, by the jealousy of the nobility, to make some modifications in it. Another of his edicts revoked the grants made by his father and brother from the royal domain, and became the foundation of the constitutional principle that that domain was inalienable. In other edicts he gave increased regularity to the legal and fiscal institutions which were gradually superseding the arrangements of the feudal system. These edicts were issued by the king as from himself, and the States-General were carefully precluded from the exercise of any properly legislative functions.

The south of France was during this reign the scene of cruel persecutions, directed by the influence of the pope, John XXII., against those accused of sorcery and against the Franciscan monks. In 1320 an immense body of the French peasantry assembled from all parts for a crusade, attracted by two priests, who preached that the deliverance of Jerusalem was reserved not for the high-born and noble, but for the meek and lowly. They soon became disorderly, and perpetrated the most merciless outrages on the Jews, until they were put down by force, or died of famine and disease. The most fearful severities were exercised against those of them who were taken. In 1321 a dreadful persecution was directed against those afflicted with leprosy (a disease which the crusaders had brought from the East), on a charge of having poisoned the wells; and also against the Jews, on a charge of having instigated them. A hundred and sixty Jews of both sexes were burnt in one fire at Chinon near Tours; others were banished and their goods confiscated. It was while engaged in these cruel proceedings that Philippe le Long died, Jan. 3, 1322, at Longchamps near Paris, after a reign of rather more than five years. He left four daughters; but the Salic law excluded them from the throne, and he was succeeded by his brother Charles IV., or Charles le Bel.

PHILIPPE VI., or, as he is usually called, **PHILIPPE DE VALOIS**, succeeded to the throne shortly after the death of Charles IV. le Bel (A.D. 1328), and was the first king of the collateral branch of Valois. He was son of Charles, count of Valois, a younger son of Philippe III. le Hardi, and cousin to Louis X. le Hutin, Philippe le Long, and Charles le Bel, who successively wore the crown. In the reign of Philippe le Long he had headed an expedition of the nobles and gentry of France to overthrow some chieftains of the Ghibelin party in Lombardy. His presumption and incapacity involved him in difficulties, from which he was relieved only by the policy or generosity of his opponents, who allowed him to retire with his army into France (A.D. 1320).

Charles le Bel died Feb. 1, 1328, and left no male heirs; but his widow was pregnant, and the nobles of the kingdom determined to wait the result of her confinement; and in the mean time the sovereign power, with the title of regent, was confided to Philippe de Valois. When the queen was delivered of a daughter (April 1), the right of succession was far from clear. All the doctors of civil and canon law agreed that women were excluded from the succession; but they were divided on the question whether a woman, being disqualified merely by sex, might transmit a right to her descendants, just as a lunatic or an idiot might be supposed to do; or whether the disqualification affected not only the woman herself, but all who might otherwise have derived a claim through her. But however the lawyers might agree as to the exclusion of females, the operation of the Salic law had been too recent, and too obviously the result (in part at least) of the superior power of the male claimant, to be entirely satisfactory to the public mind, or to those whose interests were concerned in the dispute; and Philippe, count of Evreux, who had married the daughter and heiress of Louis le Hutin, and was, in right of his wife, the nearest in direct succession, might have been a powerful rival, had he not readily exchanged a right of so doubtful a character for the peaceful possession of the throne of Navarre. The daughters of Philippe le Long and Charles le Bel, all yet in childhood, wanted either the inclination or the power to advance their claims against so formidable a competitor as Philippe de Valois; and Edward III. of England, who was next in succession, as being son of Isabelle, sister of the last three kings, was as yet also a minor, and too closely beset with difficulties at home to think of serious measures to vindicate his claim. The power therefore of Philippe as regent, his mature age, his large hereditary possessions, and his popular character, added to the plausibility of his claim, as the nearest male heir claiming through male ancestors, enabled him quietly to ascend the throne. He was crowned at Reims, May 29, 1328. Isabelle, in the name of her son Edward III., protested against this invasion of his rights; but as Edward did homage to Philippe the next year for Guienne, he may be considered as having renounced his claim, which would probably never have been revived but for subsequent events.

The first important enterprise of Philippe after his coronation was an expedition into Flanders, to put down the burghers of the great towns, who had revolted against their count. The Flemings surprised him in his camp at Cassel, but were defeated with great slaughter (Aug. 23, 1328), and Philippe returned to France with all the glory of victory. The early years of his reign were also occupied in regulating the coinage by successive edicts, in settling the boundaries of the civil and ecclesiastical jurisdictions, and in determining the succession to the county of Artois. This was claimed by Robert, count of Beaumont, more familiarly known as Robert of Artois, against his aunt Mahaut, who had usurped the county in his minority, and had been confirmed in possession by the parliament of Paris, influenced by the king Philippe le Bel. Robert had subsequently tried to obtain his right both by force and by legal process, but was defeated. He now (A.D. 1330) made another attempt with more favourable prospects, but was again defeated, and banished the kingdom for having forged some documents in support of his claim. He subsequently retired into England (A.D. 1333), and instigated Edward III. to renew his claim to the French throne.

A crusade against the Moors of Granada was a favourite project of Philippe; but the concessions which he demanded of the pope, as the price of his services in this affair, were too exorbitant, and the project failed (A.D. 1332). He also sent assistance to David Bruce, king of Scotland, against Edward III, and afforded him a refuge at his court: these measures, and disputes which arose in Guienne, tended to hasten the approaching rupture between France and England. He renewed his project of a crusade, and visited the pope, Benedict XII., at Avignon (A.D. 1336), but the project never took effect; and he endeavoured to obtain by exchange possession of the duchy of Bretagne; but this plan also failed. At length (A.D. 1337) war between Edward III. and Philippe broke out. The former assumed the title of king of France, and formed an alliance with the Flemish burghers, at that time under the influence of James Arteveld of Ghent. His fleet took and destroyed Cadsand (A D. 1337), and he made two fruitless campaigns on the side of Flanders (A.D. 1338, 1339). In 1340, the French, first under Jean, son of Philippe de Valois, and then under the king in person, attacked Hainault, the count of which was in alliance with Edward; but the defeat of the French fleet at Sluys (June 24th), induced Philippe to retire; and after some other hostilities, an armistice of six months was concluded.

Our limits do not allow us to particularise the incidents of the struggle which was carried on, both in Bretagne, where Edward and Philippe engaged as auxiliaries [BRETAGNE], and in other parts. In the course of it, Philippe sought to obtain money by depreciating the coinage (A.D. 1342), and by establishing the gabelle, or government monopoly of salt (A.D. 1343). He violently and arbitrarily put to death some Breton and Norman gentlemen (A.D. 1343), and tampered repeatedly with the currency. Some regulations were issued (A.D. 1344) in order to revive commerce and regulate the administration of justice, the last almost the only acts of his reign that were really useful (A.D. 1344). He arrested the Lombard and other Italian merchants in his dominions, and confiscated their goods (A.D. 1347). The latter years of his reign were as unfortunate as his measures were unjust. He sustained a great defeat at Crécy (A.D. 1346) [CRECY]; lost Calais, the key of his kingdom on the side of England (A.D. 1347) [CALAIS]; and was unsuccessful on the side of Guienne and Poitou (A.D. 1345, 1347). A dreadful pestilence, which swept away a third part of his subjects (A.D. 1348), filled up the measure of his adversity. The acquisition of the district of Viennois, ceded to him by the dauphin or lord of that country [DAUPHINE], was a poor counterbalance to these calamities.

The death of Philippe was owing to debility, the result of an unseasonable marriage with the princess Blanche of Navarre, a girl of eighteen, who had been promised to Jean, Philippe's eldest son. During Jean's absence, the king married her himself. He died at Nogent-le-Roi, near Chartres, Aug. 22, 1350, in the fifty-seventh year of his age, and the twenty-third of his reign.

PHILIPPE (Dukes of Burgundy). [BOURGOGNE.]

PHILIPPI. [BRUTUS; MACEDONIA.]

PHILIPPIANS, EPISTLE TO THE, is one of the epistles written by St. Paul during his first imprisonment at Rome. [PAUL, ST.]

Like the other early churches planted out of Palestine, the church at Philippi in Macedonia consisted of Jews and Gentiles, the latter forming the larger portion. These Philippians must however have had cultivated minds, and have been acquainted with the manners, customs, and philosophy of the Greeks, since the epistle contains allusions the force of which no other persons could fully understand. They were first converted by the preaching of St. Paul about twelve years before the date of this epistle, which was written apparently but a short time before his release from his imprisonment at Rome, A.D. 63.

The occasion of its composure seems to have been the following:—the Philippians, having heard that St. Paul was a prisoner at Rome, sent contributions for his relief by the hand of Epaphroditus, whom Theodoret and others represent as their bishop. St. Paul, being much rejoiced by this proof of their affection towards him, and by learning how great was their proficiency in all Christian excellences, sends back Epaphroditus with this epistle.

In addition to the utterance of his joy on these accounts, he gives them admirable instructions for the purpose of fortifying them amidst their exposure to the scourge of persecution and the contagion of false teaching; and of exciting them to cultivate a oneness of thought and feeling, and ever to aim at higher measures of knowledge and obedience. These instructions he enforces by holding up the most ennobling views of the Christian religion, as affording its disciples a scope for leading a life at once contemplative and active, and so giving them the power of enjoying and diffusing substantial happiness.

In this epistle St. Paul discovers much of his own character, the traits of which cannot fail to create in the mind of an attentive reader an idea of true dignity. He delicately proposes his own conduct for the imitation of the Philippians, and, with no mixture of affected humility, he disclaims all personal merit for whatever wisdom or goodness they had seen in him or heard of him. His language is for the most part constructed with great skilfulness; his thoughts are arranged in an order exactly suited to his design; and his manner is at once affectionate and authoritative.

The canonical authority of this epistle has never been doubted. But because St. Polycarp speaks of St. Paul as having written to the Philippians *epistles*, some critics have thought that this is not the only epistle which they received from St. Paul, or that it was originally two. In reply to this it may be observed that instances from writers both Greek and Latin could easily be produced to show that the plural form of this word must sometimes be understood in the sense of *one epistle only;* and that there is no other reason to suppose that St. Polycarp referred to any writing but this epistle of St. Paul as we now find it.

(Theodoret and Bishop Fell *On St. Paul's Epistles;* Fabricius, *Bibliotheca Græca;* Schott, *Isagoge.*)

PHILIPPICS. [DEMOSTHENES.]

PHILI'PPIDES of Athens, a poet, and a writer of the new comedy, flourished about B.C. 335. He wrote forty-five plays, of which the titles of twelve are mentioned by antient authors. He died of joy at an advanced age, after he had obtained a prize which he did not expect. (Suidas, *Lexicon;* Fabricius, *Bibl. Græca.*) Some fragments of Philippides have been collected by Hertelius and Grotius.

PHILIPPINES, THE, constitute the most northern group of the islands that compose the extensive archipelago known under the name of the Indian Archipelago; and they lie between 5° and 20° N. lat. and between 120° and 127° E. long. The Strait of Balingtang, or Great Passage, separates them from the Batanes and Bashee Islands, which lie farther north. On the east extends the Pacific, and on the south the Celebes Sea. Two rows of small rocky islands, which run from the southern coast of Magindanao, the most southern of the larger Philippine Islands, southward to the northern parts of Gilolo and Celebes, unite the Philippines with the Moluccas, and separate the Pacific from the Celebes Sea. Another row of rocky islands runs from the south-western extremity of Magindanao west-south-west to Capes Unsang and Labian in Borneo. They are called the Sulo Islands, and between their eastern extremity and Magindanao is the Strait of Basilan, which is frequently navigated by vessels sailing to China. Farther north, the Philippines are connected with Borneo by another chain of islands, which extends in a north-north-east and south-south-west direction between the island of Mindoro, one of the Philippines, and the Capes of Inaruntang and Sampanmangio in Borneo. This chain, which is called the Palawan Islands, or the Archipelago of Felicia, separates the Mindoro Sea from the Chinese Sea, which are connected by Mindoro Strait. The Mindoro Sea and the Chinese Sea wash the western shores of this group.

The Philippines consist of ten larger and a great number of smaller islands. The larger islands have altogether an area of more than 120,000 square miles, according to the estimate of Berghaus, in which the surface of Magindanao, whose coasts are very imperfectly known, is estimated at 36,140 square miles. The smaller islands comprehend, according to the same authority, 6230 square miles; and the whole group more than 127,000 square miles, which is about 15,000 square miles more than the surface of the British Islands. Nine of the larger islands are considered as subject to the Spaniards, who have also some settlements on the northern and south-western coast of Magindanao, the remainder of this island being in possession of the sultan of Magindanao and some native tribes. We shall notice the larger islands separately.

1. *Luzon,* which is by far the largest of these islands, has according to Berghaus, an area of 57,405 square miles, which approaches very nearly the area of England and Wales

The name means a *mortar*. When the Spaniards, at their arrival, asked for the name of the island, the natives, who had mortars before their doors, called *losong*, and which are used in cleaning rice, thought they were asking for the name of these utensils, and answered accordingly: thus the island, whose proper name seems to be Ybalon, received the name of Luzon. The form of the island, which is extremely irregular, may be compared to a bent arm. Its length, along a straight line drawn from the most southern point, Punta Calaan, to Punta Cabicunga, hardly exceeds 420 miles, but measured along the bend it is more than 550 miles. The width varies between 10 and 136 miles. Where the bend occurs, which is near 14° N. lat., a deep bay enters the land from the north, and divides the island into two peninsulas. The isthmus which connects the two peninsulas is only from 10 to 12 miles wide, and nearly 50 miles long. The western and smaller peninsula is distinguished by the name of Camarines. Besides the bay, which lies to the east of the isthmus, and is called Seno de Lamon, the rocky coast of the island is indented by a great number of larger and smaller bays, among which the most extensive on the larger peninsula are the Bahia de Manila and the Golfo de Lingayen, both on the western side; and on the peninsula of Camarines, the Bahia de S. Miguel and the Seno de Albay on the northern coast, and the Seno de Ragay on the southern.

That portion of the island which lies north of 16° N. lat. seems to consist of one extensive mass of rocky mountains, which in many places come close to the shore of the sea, and in others are divided from it only by a narrow strip of low and frequently sandy ground. This mountain-mass terminates on the eastern shores of the island in very steep and high rocks, which render nearly the whole of this coast inaccessible. Accordingly we find that, except at one place, where there is a bay of moderate extent, there is no settlement of the natives of Malay origin, and the mountains, which rise to a great elevation, are only inhabited by the wandering Haraforas. This mountain-region, which extends from Cabo S. Ildefonso, on the south, to Punta S. Vincente on the north, a distance of nearly 200 miles, with an average width of 30 miles, is known under the name of Montes Caravallos. Along its western declivity there is a valley which is traversed in its whole length by a river called Cagayan or Tagayo. Between 14° and 15° N. lat. this valley enlarges to a plain of considerable extent, called Llanada del Difun, on which there are several Malay settlements, as well as in the valley itself, which extends to the northern coast of the island, and seems to be in general of moderate width. These are the only settlements in the interior of the northern districts of Luzon which are subject to the Spaniards, and they do not appear to be numerous or large. We are not informed whether the river Cagayan is navigable. West of the vale of the Cagayan there is another mountain-region, which is also 200 miles long, and probably above 60 miles in width. It is called Sierra Madre, and appears to rise even higher than the Montes Caravallos; the western declivity however is not steep, but has a gentle slope, which in some parts sends out low rocky ridges to the beach, but generally terminates at some distance from it, leaving between its base and the sea a wide tract of comparatively level and fertile ground. On this tract, and on the banks of some rivers which furrow the mountain-slope, the settlements are numerous. The Sierra Madre only extends to the northern coast of the island in one place, where a high rocky mass, called also Montes Caravallos, reaches the very beach. The low country which separates the sea from the steep declivity of the Sierra Madre along the northern coast is sandy, and generally sterile; the settlements in this part are consequently small and few in number. The elevation of the mountains has not been determined, but it is observed that they do not attain the snow-line, and probably they do not rise above the line of trees.

The Montes Caravallos, or eastern mountain-mass, do not terminate at Cabo de S. Ildefonso, but continue southward to Puerto Lapan (15° N. lat.), and so far they seem to preserve their high and rugged character, though the width is diminished to about 10 miles. But as they proceed farther south between the sea and the lake, called Laguna de Bay, they diminish in height as well as in width. Their general elevation in this part, according to an estimate of Meyen, does not exceed 4000 feet above the sea-level, though a few summits may rise 2000 or 3000 feet higher. In this part of the range both declivities are gentle, and admit agricultural settlements, which however are more numerous towards the lake than towards the sea. The Montes Caravallos continue farther south, and turning to the south-east they apparently run in an unbroken line through the isthmus which joins the peninsula of Camarines to the main-body of Luzon, and they terminate at the south-eastern extremity of the isthmus in the projecting promontory called Cabesa Bondoc.

The Montes Caravallos are not united by a mountain-ridge with the Sierra Madre; but south of 16° N. lat., near the southern extremity of the last-mentioned mountain-mass, a broken and elevated tract extends between them, which constitutes the uniting link between the two mountain-masses; along the south-western base of this tract and the western of the Montes Caravallos, there is a level plain of great extent and fertility, called the Plain of Pampanga. This plain extends from the innermost recess of the Gulf of Lingayen (16° N. lat.) on the north, to the Bahia de Manila (14° 45′) on the south. It is about 90 miles in length, with an average width of about 30 miles, so that it covers a surface of 2700 square miles. A few isolated hills rise on this plain, among which one attains a considerable elevation: it is called Mount Aragat, and is remarkable for the great number of hot springs which issue from its base, and the deep ravines by which its sides are furrowed. The whole plain is very little elevated above the sea-level, full of lakes, and traversed by rivers, whose course is nearly imperceptible except in the rainy season. In the northern districts there is a large lake, the Laguna de Canarim, on the most elevated part of the plain; two rivers issue from it, one towards the north, which falls into the Gulf of Lingayen, and the other towards the south, which enters the Bahia de Manila. These rivers, of which the first is called Rio Grande, and the second Rio de Pampanga, are of great importance, as the produce of this rich and well cultivated tract, which is mostly covered with plantations of sugar, can be brought by water to Manila during the rainy months. The population of this plain probably does not fall short of half a million.

The Plain of Pampanga does not extend on the west to the shores of the Chinese Sea, being separated from it by another mountain-region, the Montes Zambales, which extend from the promontory of Bataan, on the west of the Bahia de Manila, northward to Cape Bolinao, which constitutes the western side of the Gulf of Lingayen. This mountain-region is about 100 miles long and 20 miles wide. The highest portion of it is towards the south, where its general elevation is estimated to exceed 7000 feet. North of 15° N. lat. however the mountains grow lower, and where they approach Cape Bolinao they are of moderate elevation. Five summits in this mountain-mass rise to a greater elevation, but the height of none of them has been determined. These mountains approach very near the sea, and agricultural settlements have been formed only in a few places. The mountains themselves are wooded, and in possession of the Aetas, or original inhabitants of the island. It is not said that any active volcanoes exist in any of the mountain-regions in the northern districts of Luzon, except that a mountain, probably that which on our maps is called St. Thomas, and which lies on the western side of the Gulf of Lingayen, in 16° 12′ N. lat., made an eruption in 1641.

The Bahia de Manila, is one of the finest basins in the world. It is nearly of a circular form, and measures from 20 to 25 miles in every direction. It is nearly free from shoals, and contains excellent anchorage. The surface is rarely agitated by winds. It is entered by two channels: the northern, called Boca Chica (little mouth), is more than 2 miles wide between the large island of Corredigor and the peninsula of Bataan; the southern, between the small island of Pulo Cavallo and the Isla Sinalan, near the southern coast, is nearly 6 miles wide, and called Boca Grande. The bay is usually entered by the Boca Chica, except when the wind blows from the east, which always produces a strong current running westward through this channel, and the Boca Grande is then preferred. The tides in this bay are very irregular during the north-east monsoon, when the low tides run through the Boca Chica with rather a strong current for 18 hours, whilst the high tides last only six, and are sometimes feeble, sometimes strong. The rise is about three feet at full and change. There is an excellent harbour before the Boca Chica called Puerto de Mariveles.

The shores surrounding the bay are low, except at the entrance, where there are rocky mountains of considerable elevation. Along the northern shores the low Plain of Pampanga extends for nearly 20 miles, and is here divided into a great number of islands by the numerous branches into which the Rio de Pampanga divides as it approaches the bay. A hilly country begins west of the bay and a mile or two from the shores, and extends eastward to the Laguna de Bahia. This lake is about 20 miles long, and on an average 10 miles wide, but is divided into two nearly equal parts by a projecting tongue of land and an island situated opposite its termination. The western part of it is in general only from 5 to 6 feet deep, but the eastern part is much deeper, and in the centre it is from 17 to 20 feet deep. It is surrounded by low land, which at a short distance rises into hills. The surface of the water is about 36 or 40 feet above the sea-level of the bay. The water of the lake is carried off by five very narrow channels, which soon unite, and, being joined by a small river, constitute a wide and tolerably deep stream, called the Rio Pasig, which flows westward to the Bahia de Manila, and has its outlet between the two towns of which the capital consists. The slightly hilly country that surrounds the lake and extends on both sides of the Rio Pasig is very fertile and populous.

From the banks of the river and of the lake the country rises gradually to the south for 10 or 12 miles, when it is followed by a tract of land the surface of which is extremely uneven, and has a number of isolated mountain-summits scattered over it, many of which rise to a considerable height. Nearly in the middle of this region is the Laguna de Taal, a lake of a circular form, about 12 miles in length from north to south, and 10 miles in width where it is broadest. This lake contains the island of Taal, and the volcano of the same name, which made a great eruption in 1754: in 1825 smoke issued from it. At a considerable distance east of the lake is another volcano, called the Banajan de Tayabas. The country which extends southward from these volcanoes appears to be of great fertility, and is pretty well settled: it terminates on the south at the Estrecho de Mindoro, or the Little Strait of Mindoro, so called to distinguish it from the Large Strait of Mindoro, which lies farther west and separates the island of Mindoro from the islands of Calamianes. The Little Strait of Mindoro is nearly 50 miles long and about 5 miles wide in the narrowest part. It is navigated by vessels, which when coming from the Pacific sail round the south-eastern extremity of Luzon through the Embocadero de S. Bernardino. On the northern shores of the Little Strait of Mindoro are two good harbours, called respectively Ensenada de Batangas and Ensenada de Balayan.

The peninsula of Camarines, or the south-eastern part of the island of Luzon, is not connected with the north-western part by a range of mountains. Towards the eastern extremity of the isthmus, which connects both parts, the mountains entirely disappear, and where the two bays called Seno de Lamon and Seno de Ragay approach nearest to one another, and are only about 15 miles apart, the intervening country is low, and constitutes a valley several miles wide, which runs across the island from one bay to the other. It is not improbable that a natural water-communication exists between the two bays, like that in the Plain of Pampanga.

The peninsula of Camarines is chiefly occupied by a mass of high mountains, which come close to the southern shores, and only in a few places leave a narrow strip of level ground. But the northern declivity of this range is not so steep, and terminates about 6 or 8 miles from the sea. The intervening tract is at some places covered with rocky hills, and in others it extends in low plains. On this tract, and at a short distance from the mountain-range, there are ten volcanoes, the names of which, from north-west to south-east, are Bonotan, Bacacay, Lobo, Colasi, Ysarog, Yriga, Bugi, Masaraga, Albay, or Mahon, and Bulusan. The Volcano de Ysarog, which occupies the centre of the isthmus between the Bahia de S. Miguel and the Seno de Lagonoy is distinguished by its size and elevation; that of Albay or Mahon is noted for the frequency of its eruptions. No eruptions of the other volcanoes are recorded. There is a considerable number of agricultural settlements on this volcanic tract, especially in the country surrounding the Bahia de S. Miguel. This bay is about 25 miles long from north to south, with an average width of 12 miles. On the south it is enclosed by a low and fertile tract, but near its entrance the country rises into high hills. Being enclosed by high ground, and having excellent anchorage, it forms a very good and safe harbour. A shoal in the middle of the entrance has only four feet water on it, but the channels on each side of the shoal are deep and free from rocks. The strait which divides the most south-eastern extremity of Luzon from the island of Samar, is called the Embocadero de S. Bernardino, and is dreaded by navigators on account of its currents and eddies.

2. *Mindoro*, which is separated from the island of Luzon by the Little Strait of Mindoro, and from the islands of Calamianes by the Great Strait of Mindoro, is 100 miles long, and rather more than 40 miles wide on an average. Its area, according to Berghaus, is 4115 miles. The mountains which occupy the interior rise to a very great elevation; but they descend in gentle slopes, and the sea-shore is skirted by low hills, which are covered with forests of lofty trees. There is only a small number of Malay families settled on some points of the coast. In 1818 their number did not exceed 951, and the whole population amounted only to 4680 individuals. It is the least important island of the whole group, though it has several good harbours on the Great Strait of Mindoro, among which the Ensenada of Manguirin, towards the north, and the Ensenada of Palavan, towards the north, are the most extensive; but the approach is dangerous, owing to reefs.

3. *Panay* has the form of an isosceles triangle, the base of which is more than 100 miles long, and the other sides more than 80 miles. The area, according to Berghaus, is 4579 square miles, or nearly double that of Devonshire. Along the western coast the country is of moderate elevation, well cultivated, and populous; villages are numerous; and the churches, though small, are well built. At some distance from the shore, a mountain-ridge runs from Punta Potol, on the north, to Punta Nasog, or Naso, on the south, and appears to be very steep. We have no account of the natural features of the countries contiguous to the northern and south-eastern coast. According to the census of 1818, the population of this island was 292,750; and according to an estimate in 1837, it had increased to 406,030 individuals. This shows that Panay is the most important island of the whole group next to Luzon, and is even more densely peopled than that island.

•4. *Negros* is about 140 miles long, with an average width of about 25 miles. The surface, according to Berghaus, is 3827 square miles, or 1000 miles more than the county of Lincoln. We are not acquainted with its surface and soil. It seems to be very mountainous, and contains a comparatively small number of agricultural settlements. The population subject to the Spanish government in 1818 consisted of 35,445; and in 1837, of 35,622 individuals.

5. *Zebú*, or *Cebú*, extends in length from south to north rather more than 100 miles, but it is hardly more than 20 miles wide on an average. The area, according to Berghaus, is 2193 square miles, or about 150 square miles more than that of Norfolk. We are not acquainted with its natural features and the quality of the soil, but we may presume that it does not contain much waste land and high mountains, as the population is very considerable. In 1818 it amounted on the island to 68,772 inhabitants; and in the whole province, which included the island of Bohol and four smaller islands, it amounted to 168,426 individuals. According to the returns of 1837, the population of the whole province had increased to 250,817 individuals.

6. *Bohol*, situated between Zebú on the west and Leyte on the east, is the smallest of the larger Philippines except Masbate. It extends in length from west to east about 45 miles, with an average width of 30 miles. Berghaus determines the area to be 1354 square miles. We have no account of its natural capabilities, but they must be great, as it contained in 1818 a population of 80,344 individuals, or nearly 60 persons to a square mile. According to the account of 1837, in which the island is included in the government of the province of Zebú, we must suppose that it has greatly increased since the census was taken.

7. *Leyte*, or *Leite*, extends from south to north about 120 miles, with an average width of 35 miles. According to Berghaus, the area is 4257 square miles. We are no better acquainted with this island than with those to the west of it. The population of the province of Leyte, to which two smaller islands of inconsiderable extent belong, amounted, in 1818, to 40,623; but in 1837, to 92,165.

8. *Samar*, or, as it is also called by the natives, *Ybabas*, is the largest of the Philippines which are subject to• Spain, next to Luzon. It has the form of a triangle whose apex is turned to the south: the base measures about 60

miles, and the perpendicular length about 115 miles. The surface is 5547 square miles, or about 300 square miles less than Yorkshire. A great part of this island, especially towards the north, is covered with high mountains, which are visible from a great distance at sea. The soil in general, though not distinguished by fertility, is far from being sterile. According to the census of 1818, the population of Samar and the small island of Capul amounted to 57,922 individuals, a number which had increased in 1837 to 99,635.

9. *Masbate* is in the middle of that sea-basin which is surrounded by the islands described from No. 2 to No. 8, and by the peninsula of Camarines, and is called the Bisaya Sea: the islands surrounding this basin and those within it are comprehended under the general name of the Bisaya Islands. Masbate has a triangular form, whose apex is to the east. The base, or western coast, is nearly 40 miles long, and the perpendicular length about 55 miles. Berghaus makes the surface 1225 square miles. This island appears to be a mass of high rocks, and to contain very little cultivable ground. The population is very small. In 1818 it did not contain more than 2310 persons.

Between the most northern point of Masbate and the promontory of Cabesa Bondoc is the island of Burias, which has an area of only 327 square miles. It does not acknowledge the authority of the Spaniards. When Forest was on Magindanao, he was informed that the Illanos from that island had formed a settlement on Burias, and that the Spaniards had been unable to expel them.

10. The island of *Magindanao*, or *Magindano*, is the most southern of the Philippines, and the largest next to Luzon. Its form is extremely irregular. Berghaus makes the area 36,140 square miles, or about 14,000 square miles less than that of England without Wales. The coast-line perhaps considerably exceeds 1000 miles. Our information respecting this island is very scanty, and we are indebted for the little that we know to Forest, who visited the island in 1775, and remained there nearly eight months. From the information that he collected during his stay, we learn that where the meridian of 124° E. cuts the island, two bays penetrate into it, the Bay of Illano from the south, and that of Siddum, or Panguyl, from the north, and that their innermost recesses are only two days' journey from each other. Near the isthmus which is thus formed is a large lake called Lano, which is from 15 to 20 miles wide from south to north, and has a greater extent from east to west. The country enclosing the western portion of the lake is hilly, but on the east of it extends a large, fertile, well-cultivated, and populous plain, inhabited by a tribe of the Malay race, called Illanos. The population of the country enclosing the lake was stated to be 61,300. Along the southern shores the country, as far as Forest had an opportunity of seeing it, was in most parts hilly, but not mountainous: in some places there were extensive plains, and most of the valleys were wide and fertile. It seems however that the country which lies along the eastern shores of the island contains ranges of lofty mountains, which are inhabited by the Haraforas, or original inhabitants of the island. The country west of the isthmus, between the bays of Illano and of Siddum, probably contains mountains only in the northern districts, and is entirely inhabited by Malays. Numerous rivers water this large island; but we are only acquainted with the Pelangy, which flows from east to west, rising near 125° 30′ E. long., and falling into the Bay of Bongo opposite the island of Bunwert. Though its course probably does not exceed 100 miles, it is navigable for large river-boats to a great distance from the mouth, and drains a wide and fertile valley, which enlarges near the sea into an extensive plain, where the river divides into several arms, and forms a very fertile delta. Forest observes that large tracts of this island are destitute of trees and covered with fine grass, and that such savannahs do not occur in any other island of the Indian Archipelago. There are volcanoes on Magindanao: the existence of three is certain. One of them, the Sanguili, is not far from the southern extremity, 5° 44′ N. lat. and 125° 18′ E. long. There is another northwest of Cape S. Augustin, the south-eastern point of the island; and a third on the eastern side of the Bay of Illano. Between the northern coast of Magindanao and the island of Zebú, is the island of Siquijor, or Fuego, on which also there is an active volcano.

Magindanao is politically divided into three parts. The Spaniards have formed a great number of settlements on the eastern and western coast, where the inhabitants consist almost exclusively of Bisayes, or Malays of the Philippines. These settlements constitute two provinces of the general Capitanancy of the Philippines. The Spaniards have also a military establishment at Zamboanga, on the Strait of Basilan, at the south-western extremity of the island, in order to prevent the pirates from the Sulo Islands from extending their predatory visits to the Mindoro Sea. But these islands are exposed to the depredations of the Illanos, who not only possess the country about the lake of Lano, but also the greatest part of the shores of the Bay of Illano, and the western coast of the island between the Strait of Basilan and the wide and open bay of Sindangan. The large peninsula which extends between the Bay of Illano on the west and the Pacific on the east acknowledges the authority of the sultan of Magindanao, whose subjects are mostly Malays, and inhabit the country along the coast; but the interior is occupied by the Haraforas, who are treated by the Malays not as subjects, but as slaves.

Climate.—We do not possess a regular series of meteorological observations for any of the Philippines, except those made by Le Gentil at Manila more than sixty years ago, and they are of little value. Meyen, who was there in September and October, found that in this season of the year the thermometer never exceeded 83° at noon, and generally remained below 80°, and that the difference between day and night rarely amounted to 6 degrees. Comparing his observations with those of Le Gentil, he thinks that the mean temperature of the summer may be fixed between 80° and 82°, and that of the winter between 70° and 72°, and that the mean temperature of the whole year probably would fall somewhat short of 77°. The year is divided between the dry and rainy seasons, which depend on the monsoons. The rainy season occurs in the south-west monsoon, during which an immense quantity of water comes down, the rains sometimes continuing for ten or even fourteen days without intermission. The rains commence in the beginning of May, and do not cease before the end of October or the beginning of November. They attain their maximum in the month of July. Between the beginning of November and the end of April showers sometimes occur. The northern part of Luzon is situated within the range of those terrific hurricanes which are called *tifun*, and which are rarely felt south of 14° N. lat. These winds occur between the beginning of May and the end of December, but are less violent towards the end of the year. In June and July they rage with incredible fury; but they generally blow only four or six hours, and frequently for a shorter time. They begin to blow from the east, in a contrary direction to the then prevailing south-west monsoon, and turn gradually to the south and south-west, when their force begins to fail. The damage which is caused by them is as great as that produced by the hurricanes of the West Indies. Earthquakes occur frequently, and sometimes cause great damage.

Productions.—The staple articles for the European market are sugar, indigo, rum, and tobacco; and for the Chinese market, sapan-wood, rice, edible birds' nests, and trepang. The sugar-cane is most extensively cultivated in the Plain of Pampanga; and though the manner of preparing the sugar is not a good one, the sugar itself is much prized, and sent to many parts of Europe. Indigo is cultivated to a great extent, and some has been exported, which was not considered inferior to that of Guatemala; but in general the manufacture of this article is not conducted with sufficient attention. Tobacco, which grows very well in many places, and is of the first quality, is only exported in the form of cigars. Rice, for which there is always a ready market, and which constitutes the principal food of the bulk of the population, is the first object of cultivation nearly all over the island. Where the fields cannot be put under water, the upland rice is cultivated. Sapan-wood (Caesalpinia sapan) abounds in some of the mountainous districts, in the forests, and finds a ready sale in China. The quantity of edible birds' nests and trepang which is sent to China is not great. A small quantity of coffee, ebony, sulphur, cotton, pearls, mother-of-pearl shells, tortoise-shells, and cordage, are also exported. The coffee-plant was introduced about fifty years ago, and is now found wild in many of the woods surrounding the Laguna de Bay, having been propagated by a species of civet cat which swallows the berries. The greater part of the coffee exported from Manila is gathered from these wild plants, and is equal or superior in flavour to that of Bourbon. Cotton cannot become an important article of exportation until some method is adopted, less expensive than that now in use, of separating it from the seed. Cordage is made from the fibres of a species of banana. The exterior fibres of its stem, which grows to the height of seven or eight feet, are coarse, like hemp; but the inner fibres are finer; and those near the centre are finer than the best flax, and are used in the island in the manufacture of several stuffs for clothing. The hemp itself has also of late supplied an article of exportation. Cacao, which has been brought from Guatemala, is cultivated in many places in Luzon, and has even spread to the most southern islands. Forest found a cacao-tree in Magindanao. The consumption of chocolate being great, cacao is not exported, though it is said to be equal to the best grown in America. Cinnamon is said to grow wild in many of the islands, and the clove-tree is found on Magindanao. The sago-palm is also indigenous, but the cultivation is little attended to.

The principal food of the inhabitants consists of rice and fish. They also cultivate millet and several kinds of beans and other pulse. The fruit-trees which succeed best, besides the cocoa-nut, the cultivation of which is carefully attended to, are the bread-fruit, mango, and two kinds of oranges and figs. The plantations of plantains are extensive, and also those of areca-nuts. The bamboo and prickly calamus are cultivated, and both of them supply materials for the construction of the habitations of the natives.

The buffalo is universally used in all field-labour, though in some parts people have begun to substitute the bullock for it. The buffalo here, as on all the islands of the Indian Archipelago, is of uncommon size and strength; the caymans, which are in the Laguna de Bay, and rather of a large kind, never attack a buffalo. Cattle have been introduced by the Spaniards, and are abundant in some parts of the plains, which are destitute of woods, like the prairies of North America. Horses have also been introduced by the Spaniards; the breed is small, but very hardy; they are only used for riding. Sheep are few, but goats are more numerous. Pigs are plentiful, except on Magindanao, where the inhabitants are Mohammedans. Domestic fowl are reared in immense numbers, especially ducks on the banks of the Laguna de Bay. Except the caymans, which are numerous in the Laguna de Bay, there are no rapacious animals. The woods swarm with deer and wild hogs. The Philippines are rather distinguished by the number than by the variety of wild fowl. The sea abounds with fish, and the inhabitants, like all the tribes of the Malays, prefer fish to meat. The number of families which gain their subsistence by fishing is very great. Among the fish found in the Laguna de Bay is a saw-fish of large size, which attacks the cayman. Besides pearls and great quantities of mother-of-pearl shells, cowries are very plentiful about some of the smaller islands and rocks. Wild bees are very numerous in the woods, and wax and honey are important objects of internal commerce. The islands rarely suffer from drought, and are periodically (perhaps once in ten or fifteen years) devastated by locusts.

Gold, iron, and copper are said to exist in Luzon and Magindanao, but at present none of these metals are worked. It is said that gold is tolerably abundant on the mountains along the northern shores of Magindanao. Salt is made in several places, and brimstone is collected on some of the mountains of Luzon.

Inhabitants.—When the Spaniards took possession of the Philippines, they found the islands occupied by two different races of men. In the plains and hilly tracts several tribes of Malays had settled, who spoke different dialects of the same language, and were subject to a great number of petty sovereigns. The mountains were occupied by a black race, which belongs to the race of Austral negroes, and was called by the Spaniards, Negritos or Aetas, while the Malays were called Indios. The Negritos were probably the aborigines of the islands, and had retired to the mountains when the Malays began to occupy the lower country, being of a diminutive size, and unable to offer resistance: in the mountains they had maintained their independence. The Malays have submitted to the sway of the Spaniards, but the Negritos are independent in the mountain fastnesses: they run away at the sight of foreigners, and avoid all communication with them. It is however stated by Forest that many of the Negritos have been converted to Christianity on the island of Magindanao, where the Malays treat them as slaves, and take from their huts what they like. The Negritos of Magindanao consequently often change their abodes, and retire to those parts which are subject to the Spaniards, where they embrace Christianity in preference to Islamism, because they are permitted to eat pork, of which they are very fond. In Magindanao the Negritos are agriculturists, and the Malays who reside along the coast receive from them a considerable part of the agricultural produce necessary for their consumption, giving in return several utensils and baubles, which are brought from other countries. The Negritos in Luzon are savages, who have no fixed abode, but rove about the mountains, and live by the chase, and on wild fruits and honey. They occupy the greatest part of the Montes Caravallos, and also the higher part of the Montes Zambales. The Malays are divided into a great number of tribes, of which that called Tagala occupies the neighbourhood of Manila and the country round the Laguna de Bay. The other tribes that are numerous, the Pampanga, Zambales, Pangasinan, Ylocos, and Cagayan, inhabit the other plains and lower country. They are all subject to the Spaniards. Some of the tribes in the Sierra Madre have not embraced Christianity, and are not regularly subject to the Spanish government. One of them, the Ygorrotes, who inhabit the mountains east of the Gulf of Lingayen, are distinguished by a peculiar physiognomy and a lighter colour, which, it is supposed, must be attributed to a mixture with Chinese. As to the political condition of the Malays, it is unanimously stated that they are proprietors of the soil and free subjects, and treated by the Spaniards as such. The forts, which are built in many places along the coast to oppose the pirates, are in their power, and are garrisoned by them. It must be a matter of surprise that, under such circumstances, the Spaniards, whose number is very small (in 1818 it did not exceed 3000), are not driven out by the Malays; but this is explained by the fact of the great authority which the clergy exercise over them, and by which they are kept quiet, so that they never rise against government except when excited by the clergy, which has been the case several times. Though such a subjection to the clergy would lead us to suppose that the people must be in a low condition, this supposition is contradicted by travellers. Meyen found them well lodged, clothed, and abundantly provided with food. They seem not to be inferior to the peasantry of most countries of Europe. Besides the Spaniards, there are a few people of colour, who, in 1818, amounted to 6170 souls: there are also some Chinese, who, in 1818, were not more than 6201, of which number 1569 were Christians.

Political Divisions and Population.—The Philippines, as far as they are subject to Spain, are divided into twenty-nine provinces, of which seventeen are situated in the island of Luzon, and twelve in the smaller islands, and on the northern and eastern coast of Magindanao. The population, in 1818, amounted, according to the census, to 2,214,142 individuals; and in 1837, according to an estimate founded on the number of families paying the capitation tax, to 3,202,760. The following tables exhibit the particulars:—

1. *Population of the Provinces on the Island of Luzon, or Nueva Castilla.*

Names of Provinces.	1818.	1837.
1. Tondo	149,095	230,025
2. Bulacan	125,021	181,970
3. Pampanga	106,381	181,720
4. Pangasinan	119,322	229,402
5. Ylocos del Norte	135,748	172,207
6. Ylocos del Sur	147,095	236,510
7. Cagayan	61,322	92,222
8. Zambales	18,841	36,080
9. Bataan	23,393	36,087
10 Nueva Ecija	15,506	44,570
11. Tayabas	48,676	85,245
12. Camarines del Sur	113,892	158,972
13. Camarines del Norte		24,985
14. Albay	92,665	131,745
15. Laguna de Bay	86,689	142,805
16. Batangas	112,120	188,660
17. Cavite	51,665	91,602
	1,407,431	2,264,807

The difference between the population of 1818 and 1837 may partly be explained by the great increase of cultivation in consequence of the increased demand for the produce of the country, which was caused by opening the port of

Manila to the commerce of all foreign nations. It may also be partly accounted for by the circumstance that in the census of 1837 the tribes which are either independent or not quite subject to the Spaniards were comprehended, while in 1818 they were omitted; and their number was estimated at the last-mentioned period at the following rate:—

	Individuals.
564 families newly converted and still under the sway of the monks, composed of	2,820
788 families of friendly Ygorrotes in the province of Pangasinan, containing	3,940
2160 families of Tinguianos in the provinces of Ylocos	10,800
1180 families of unconverted Ygorrotes in the same provinces	5,900
1523 families of non-converted Negritos in the same provinces	7,615
	31,075

If these are added, the population of the island of Luzon consisted, in 1818, of 1,438,506 individuals.

2. *Population of the Islas Bisayas.*

Names of Provinces.	1818.	1837.
18. Mindoro, comprehending the islands of Mindoro . . 4670 souls Marinduque . 9777 Islas de Luban . 4349	18,796	29,632
19. Antique, or the western coast of the island of Panay	50,597	55,100
20. Iloilo, or south-eastern part of the island of Panay	176,901	230,410
21. Capiz, or northern part of Panay, including the islands— Romblon and Sibuyan 3840 Banton, Tablas, Simara, and Maestro de Campo 2824	65,262	120,520
22. Leyte, comprehending the island of the same name, and the islands of Panamao . . . 1065 Panaon . . . 3766	40,623	92,165
23. Zebu, comprehending Zebu, and the islands— Bantayan . . 5,235 Siquijor . . 5,748 Bohol . . . 80,344 Davis . . . 4,981 Panglao . . 3,346	160,099	250,817
The Islas Camotas are comprehended in a parish of Zebu.		
24. Samar or Ybabao, consisting of the island of that name and the island of Capul, with 3013 inhabitants	57,922	99,635
25. Calamianes, comprehending a group of islands called Islas de Calamianes, which properly do not belong to the Philippines, but to the Archipelago de Felicia or Palawan, and the northern portion of Palawan, called Paragua. The Islas de Calamianes contain . . 2,060 inhabitants and Paragua . 11,097	13,157	16,052
26. Islas Batanas, which are situated north of the Strait of Balingtang, or the Great Passage, by which they are divided from Luzon	10,576	8,000
27. Negrós, embracing the island of Negros	35,445	35,622
	619,378	937,953

3. *Population of the Spanish portion of Magindanao.*

Names of the Provinces.	1818.	1837.
28. Caraga, comprehending the eastern coast of the island	15,957	29,977
29. Misamis, embracing the northern coast east of the Bay of Sindangan	26,226	34,583
To these two provinces is to be added the Presidio, or military establishment at Zamboanga	8,640	10,000
	50,823	74,560

According to the census of 1818, the whole population was 2,108,707, to which however it was thought necessary to add 5 per cent. on account of some small errors, which gave the whole amount of the population 2,214,142.

The rapid increase of the population in the period between 1792 and 1837 may be inferred from the number of families paying capitation tax, which in

1792	amounted to 280,093	1815	amounted to 385,568
1805	„ 347,841	1817	„ 412,679
1812	„ 382,568	1818	„ 436,047

and in 1837 they amounted to 654,670.

Towns.—It may be presumed that in so populous a country there must be a considerable number of towns, but as travellers do not extend their excursions to any great distance from the capital, Manila, we are not acquainted with them. In the census a considerable number of towns are mentioned with a population exceeding 5000 souls, and in 34 places it is stated to exceed 10,000 individuals. Six places of the last description are noted in the province of Iloilo, in the island of Panay.

Manila, the capital and seat of the captain-general or governor of the island, is built on the eastern shores of the Bahia de Manila, at the mouth of the river Pasig, or the channel by which the Laguna de Bay discharges its water It consists of two towns with extensive suburbs. The city, Manila, is built on the southern banks of the Pasig, and enclosed by high walls, and a ditch which is connected with the river. The streets are straight, wide, and well paved. The houses are built of stone, and are substantial. There are several well-built churches and convents. The palace of the captain-general is not distinguished by its architecture, but the custom-house, or *aduana*, is a large and fine building. The city is only inhabited by Spanish families, and in 1818 did not contain above 6875 inhabitants, including the Malay servants of the Spaniards. Close to it on the south are the suburbs of Hermita and Malate, which in 1818 contained 10,550 inhabitants. A well-built bridge leads from the city over the Pasig to Bidondo, a large place, which however only contains habitations built in the fashion of the Tagala, though it is the commercial town. In 1818 Bidondo contained 21,386 inhabitants. Contiguous to it on the beach is Tondo, the capital of the province of the same name, whose population in 1818 amounted to 14,610 inhabitants. At the back of Bidondo are eight suburbs, the population of which in 1818 amounted to 23,462. The population of all these places together amounted in 1818 to 76,883 individuals. It has been asserted that the population was not less than 150,000, which is probably an exaggeration; but when the increase of the population of the province of Tondo is considered, we may reasonably suppose that Manila at present can hardly contain less than 120,000 inhabitants. The houses in all these places are built of bamboos, and are elevated from 6 to 8 feet above the ground, resting on thick pieces of bamboo. The number of Chinese is considerable, and is said to amount to 30,000, which however seems to be an exaggeration. In the large square of the city, which is more than 100 yards wide, stands the statue of Charles IV. of Spain, of bronze, somewhat larger than life. Ferdinand VII. gave it to the town of Manila in 1824. It is considered a good work, but is too small for the square. Manila contains a royal college for the instruction of youth, a university which was founded by Philip IV. in 1645, a nautical academy, an hospital for the poor, and various other religious and charitable establishments.

Cavite, which lies south of Manila, is a well built fortress, situated at the extremity of a tongue of land about two miles long: it protects the Ensenada de la Estanzuela, the only harbour in the Bahia de Manila. The arsenal is in that fortress, and vessels are built there. The fortress contained in 1818 only 1926 inhabitants, but the adjacent town of S. Roque contained a population of 9926.

Manufactures.—The Malays use very few manufactured goods exported from other countries, and they have applied themselves to some branches of manufacture with success. They make very good earthenware, which however is not exported, being much inferior to that of China. But the cotton stuffs, which are made in some parts, are, or were formerly, exported to Mexico. Another branch of industry in which they excel is the plaiting of straw and slips of wood. Hats made of the latter material are highly prized and exported. A single hat of the first quality fetches in Manila from 17 to 18 Spanish dollars, or 4*l*. Mats and similar objects are also exported. At Manila there is a royal manufacture of cigars, in which 450 persons are constantly employed.

Commerce.—The commerce of the Philippines was formerly limited to the mother-country and the Spanish colonies in America. The most important and lucrative branch was the commerce with Mexico, which was conducted by means of gallions that sailed once a year between Acapulco and Manila. They chiefly carried to America silk manufactures and other goods obtained from the Chinese, and brought in return the produce of the Mexican silver-mines. This commerce had little effect on the increase of population and the improvement of cultivation. At that time no foreign vessels, except from China, were admitted into the ports of the Philippines, and the islands accordingly advanced very slowly. But since the Spanish colonies in America have obtained their independence, the port of Manila has been thrown open to all commercial nations, and the increase of the exports has been very rapid, as appears from the following table, which shows the quantity of the principal articles exported in 1818, 1829, and 1830:—

	1818.	1829.	1830.	
Sugar	14,405	120,274	138,387	picols.
Indigo	3,400	11,809	13,863	picols.
Sapan-wood	18,825	11,675	11,594	picols.
Rice .	. .	114,793	197,486	cavan.
Cigars .	. .	4,595	4,257	arrobas.

1 picol = 140 lbs. 1 arroba = 25 lbs.

Manila carries on trade with Canton, Amoy, and Shanghae, in China; Awatska in Kamtchatka; Acapulco and other ports of Mexico; with four of the ports of the United States of North America; with London, Gibraltar, three ports of France, with Hamburg, the Mauritius, British Hindustan, Singapore, Batavia, Cochin-China, Borneo, and the Sulo Archipelago. The Chinese junks from Shang-hae do not visit any port farther west than Manila. In 1818 the number of foreign vessels that entered the port of Manila did not exceed 61; they were, Spanish 9, Portuguese 4, French 5, English 17, American 10, Chinese junks 13, and Borneo junks 3. The following table shows the number of vessels that entered the port and cleared out from it in 1828 and 1829:—

Names of the Nations to whom the vessels belonged.	Outwards.		Inwards.	
	1828.	1829.	1828.	1829
Spanish . .	38	43	31	41
American . .	—	20	29	33
English . .	—	22	13	14
Danish . .	—	—	5	—
Dutch . .	—	4	5	6
French . .	—	8	3	7
Portuguese . .	—	—	3	—
Hamburg . .	—	—	1	—
Prussian . .	—	1	4	1
Chinese . .	—	9	—	9
Other vessels, the name of the nation to whom they belong not stated	80	78	74	73
	118	186	164	184

This list is very far from being correct, as is evident from the circumstance that the nations to which nearly half the number of vessels belong, are not mentioned. But as it may serve to give some idea of the increase of the commerce of the town of Manila, we have given it as it appears in Meyen's 'Travels.'

The same author states that in 1828 the value of the goods exported amounted to 1,475,034 Spanish dollars (331,882*l.*), and that of bullion and specie to 62,486 Spanish dollars (14,059*l.*); in 1829 the goods to 1,397,623 Spanish dollars (314,465*l.*), and the bullion and specie to 62,275 dollars (12,012*l.*), and in 1830 the exported goods amounted to 1,497,621 (336,964*l.*), and the bullion and specie to 81,952 dollars (18,440*l.*). The value of the goods imported in 1828 amounted to 1,550,933 dollars (348,960*l.*), and that of bullion and specie to 401,827 dollars (90,411*l.*); in 1829 the former to 1,654,502 dollars (372,263*l.*), and the latter to 398,447 dollars (84,650*l.*). In 1830 the imported goods were to the value of 1,562,522 dollars (351,567*l.*), and the bullion and specie to the value of 178,063 dollars (40,064*l.*).

European vessels do not visit any other harbours of the Philippines except Manila, but it is very probable that the Bugis and inhabitants of Sulo, as well as the Chinese, who have a great number of junks in these seas, visit some of the smaller islands, especially the well-cultivated and populous island of Panay. The coasting trade of the Philippines is very active. It is carried on in small brigs, and in still smaller vessels, called galores, goletas, pontines, &c.; a great number of these vessels are employed in the coasting trade between Manila and the provinces of Ylocos and Pangasinan, and the islands of Panay and Zebu. In 1818 there cleared out from Manila 637 vessels of that description.

History.—The Philippines were discovered by Fernando Magalhaens in 1521, who was killed in one of the islands. [MAGALHAENS.] In 1564 a small squadron under the orders of Lopez de Legaspi was sent from Mexico to form an establishment, which he effected in the following year on the island of Zebu, the inhabitants of which submitted to the Spaniards without any resistance. In 1571 Legaspi founded the town of Manila; and as the Malays of this island were divided into a great number of communities independent of one another, and not accustomed to war, they also submitted to the foreigners almost without a struggle. Thus the Spaniards obtained the possession of this important group of islands almost without bloodshed, and they have preserved it by converting the inhabitants to Christianity, in which they have been perfectly successful, as the Islam at the time of the conquest had not extended farther than to the Moluccas. The Spaniards remained in undisturbed possession of the Philippines to 1762, when the English took the town of Manila. The inhabitants of Luzon however did not submit, but continued the war against the English under a Spanish officer, though with no great vigour. In 1764 the English restored Manila to the Spanish government. The Philippines, together with the Marianas, are administered by a governor who has extensive powers. The islands are divided into provinces, at the head of which is a governor, or alcalde mayor; and the provinces are subdivided into pueblos, which have also their petty governor, and officers subordinate to him.

(Martinez de Zuñiga's *Historical View of the Philippine Islands*; Kotzebue's *Voyage of Discovery into the South Sea, &c.*; Meyen's *Reise um die Erde*; Yldefonso de Aragon, *Estado de la Poblacion de Filipinas correspondente al anno de* 1818; Forest's *Voyage to New Guinea*; Moor's *Notices of the Indian Archipelago*; Berghaus's *Memoir von den Philippinen und Sulu Inseln*, and his *Map*; *Calendario de las Islas Filipinas*, for 1839, Manila.)

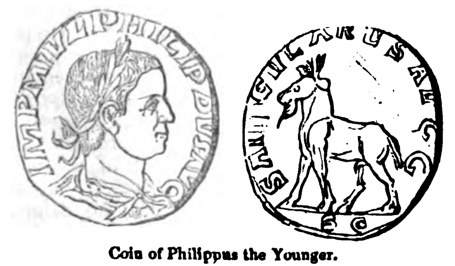
PHILIPPINES, NEW, more frequently called the Carolines, are a number of islands situated in the Pacific, between 138° and 164° E. long., and between 5° and 13° N. lat. In this wide tract of ocean there are several groups of small islands enclosed by reefs, and others are isolated. These islands are very imperfectly known, though the Spaniards, who obtained some knowledge of them from the natives who visited their settlement on the island of Guahan (Ladrones), claim the sovereignty of the New Philippines. They have however never made a settlement on any of these islands, though a Spaniard has occasionally paid them a visit, or a monk has gone for the purpose of converting the natives. Twelve years ago these islands were partly surveyed by the Russian navigator Lütke.

The islands, which lie either within the basins formed by the coral reefs, or contiguous to the reefs themselves on their interior side, are all small, and produce hardly anything except cocoa-nuts and bread-fruit. All the isolated islands are high, and some rise to a great elevation. The island of Feys rises on the shore to more than 1200 feet, but gradually slopes towards the centre, resembling in that respect most of the lower islands, which consist of a narrow strip of land of a circular form, enclosing a lagoon. The elevated islands have a great variety of trees and plants which afford food. The cultivated fields contain plantains and arums; from the root of the latter the inhabitants make flour. They also cultivate the sugar-cane, and have several fruit-trees besides the cocoa and bread-fruit, especially some kinds of fig-trees, among which is the *ficus Indica*, or banyan-tree. The areca-palm also grows on these islands. The mountains and hills are generally covered with high forest-trees, among which the cabbage-tree is common. The inhabitants belong to the Malay race, and go nearly naked: they are industrious agriculturists and fishermen. They make excellent mats, and canoes of a large size, with which they undertake voyages of several hundred miles, visiting from time to time the Spanish settlements of Guahan, to which they bring such articles of agricultural produce as will bear the voyage. They are governed by kings: the government is not strictly hereditary, but partly elective. [Lütke, *Voyage autour du Monde*.]

PHILIPPUS was also the name assumed by the impostor Andriscus, who, by pretending to be the son of King Perseus, induced the Macedonians to acknowledge him as their king, and met with so much success as to defeat one of the Roman officers. But he was ultimately driven out of Macedon by Q. Caecilius Metellus, and given up to the Romans by a Thracian prince with whom he had taken refuge.

PHILIPPUS, M. JULIUS, a native of Bostra in Trachonitis, according to some authorities, after serving with distinction in the Roman armies, was promoted by the later Gordianus to the command of the imperial guards after the death of Misitheus, A.D. 243. [GORDIANUS; MARCUS ANTONINUS PIUS.] In the following year he accompanied Gordianus in his expedition into Persia, when he contrived to excite a mutiny among the soldiers, by complaining that the emperor was too young to lead an army in such a difficult undertaking. The mutineers obliged Gordianus to acknowledge Philippus as his colleague; and in a short time, Philippus wishing to reign alone, caused Gordianus to be murdered (Capitolinus, in *Historia Augusta*). In a letter to the senate, he ascribed the death of Gordianus to illness, and the senate acknowledged him as emperor. Having made peace with the Persians, he led the army back into Syria, and arrived at Antioch for the Easter solemnities. Eusebius, who with Orosius, Zonaras, and other Christian writers, maintains that Philippus was a Christian, states merely as a report that he went with his wife to attend the Christian worship at Antioch, but that Babila, bishop of that city, refused to permit him to enter the church, as being guilty of murder, upon which Philippus acknowledged his guilt, and placed himself in the ranks of the penitents. This circumstance is also stated by John Chrysostom. From Antioch, Philippus came to Rome, and the following year, A.D. 245, assumed the consulship with T. F. Titianus, and marched against the Carpi, who had invaded Mœsia, and defeated them. In the year 247 Philippus was again consul, with his son of the same name as himself, and their consulship was continued to the following year, when Philippus celebrated with great splendour the thousandth anniversary of the building of Rome. An immense number of wild beasts were brought forth and slaughtered in the amphitheatres and circus. In the next, under the consulship of Æmilianus and Aquilinus, a revolt broke out among the legions on the Danube, who proclaimed emperor a centurion named Carvilius Marinus, whom however the soldiers killed shortly after. Philippus, alarmed at the state of those provinces, sent thither Decius as commander, but Decius had no sooner arrived at his post than the soldiers proclaimed him emperor. Philippus marched against Decius, leaving his son at Rome. The two armies met near Verona, where Philippus was defeated and killed, as some say by his own troops. On the news reaching Rome, the prætorians killed his son also, and Decius was acknowledged emperor A.D. 249. Eutropius states that both Philippi, father and son, were numbered among the gods. It is doubtful whether Philippus was really a Christian, but it seems certain, as stated by Eusebius and Dionysius of Alexandria, that under his reign the Christians enjoyed full toleration and were allowed to preach publicly. Gregory of Nyssa states that during that period all the inhabitants of Neocæsarea in Pontus embraced Christianity, overthrew the idols, and raised temples to the God of the Christians. It appears that Philippus during his five years' reign governed with mildness and justice, and was generally popular.

Coin of Philippus.
British Museum. Actual Size.



Coin of Philippus the Younger.
British Museum. Actual Size.

PHILI'PPUS (Φίλιππος), the name of several antient physicians enumerated by Fabricius (*Biblioth. Græca*). The most celebrated is Philippus of Acarnania, the friend and physician of Alexander the Great, who was the means of saving the king's life when he had been seized with a violent attack of fever, brought on by the excessive coldness of the waters of the river Cydnus, Ol. 111, 4 (B.C. 333). Parmenio sent to warn Alexander that Philippus had been bribed by Darius to poison him; the king however did not doubt his fidelity, but, while he drank the draught prepared for him, put into his physician's hands the letter he had just received. His speedy recovery fully justified his confidence, and proved at once the skill and honesty of Philippus. (Q. Curt., lib. iii., cap. 6; Val. Max., lib. iii., cap. 8, in fine; Plut., cap. 19; Arrian, lib. ii., cap. 4; Justin, lib. xi., cap. 8; Diod. Sic., lib. xvii., cap. 31.)

PHILIPS, AMBROSE, was born about the year 1671, and is said to have been descended from an old Leicestershire family. He was educated at St. John's College, Cambridge, and his first printed performance is a copy of English verses in the Collection published by that university on the death of Queen Mary, in 1695. From this date nothing is known of him till the appearance of his six Pastorals, which, Johnson observes, he must have published before the year 1708, because they are evidently prior to those of Pope. They are spoken of in the 'Guardian' (No. 40) as having been published in the same volume with Pope's, that is, in Tonson's 'Miscellany,' which appeared in 1709, and probably they had not been printed before. Philips's next performance was his 'Letter from Copenhagen' (in verse) to the earl (afterwards duke) of Dorset, dated March 9, 1709, which was printed in the 12th No. of the 'Tatler' (May 7, 1709), with an introductory eulogium by Steele, who styles it 'as fine a winter-piece as we have ever had from any of the schools of the most learned painters.' He afterwards translated the 'Persian Tales' from the French for Tonson, and brought out an abridgment of Hacket's 'Life of Archbishop Williams.' The next event of his literary life, and, on the whole, perhaps the most considerable, was the production at Drury Lane, in February, 1712, of his tragedy of the 'Distressed Mother,' which, although little more than a translation of the 'Andromaque' of Racine, was received with great applause, and long continued to keep possession of the stage. Pope, who a year or two before had bestowed high praise upon the 'Letter from Copenhagen,' calling it the performance of a man 'who could write very nobly,' but who had now been divided from Philips partly by feelings of poetical rivalry and jealousy, partly by their opposite party politics, told his friend Spence that the 'Distressed Mother' was in great part indebted for its success on the first night to a packed audience. The author's Whig friends certainly did their best for the play. It was elaborately praised, before its appearance, in the 290th No. of the 'Spectator' (for 1st February, 1712); and Addison, in the name of Budgell, wrote an epilogue for it, which took so greatly, that, according to Johnson, on 'the three first nights it was recited twice; and not only continued to be demanded through the run, as it is termed, of the play, but, whenever it is recalled to the stage, the epilogue is still expected, and is still spoken.' Other 'Spectators' were devoted (No. 335, for 25th March, 1712, by Addison) to an account of the strong impression made by the tragedy on Sir Roger de Coverley; and (Nos. 338, for 28th March, and 341, for 1st April) to an animated controversy about the merit of the epilogue, issuing of course in a triumphant vindication of it. A short time before, Philips's translation of 'Sappho's Hymn to Venus' had been printed, with strong commendation from Addison, both of that poem and of the author's 'admirable pastorals and winter-piece,' in the 'Spectator,' No. 223 (for 15th November, 1711); and the pastorals are again highly praised in Nos. 400 (for 9th June, 1712) and 523 (for 30th October), by Addison; and likewise in the 'Guardian,' No. 30 (for 15th April, 1713). But now Pope managed to play off a singular trick upon the guileless or careless nature of Steele, by imposing upon him as a serious critique an ironical discourse on Philips's Pastorals as compared with his own, in which, while the superiority was in terms assigned to Philips, every quotation and the whole treatment of the subject were artfully adapted to turn him into ridicule. It is surprising that any degree of simplicity could be so taken in; but Steele at once printed the paper, which forms the 40th No. of the 'Guardian' (for 27th April, 1713). Its appearance must at first have perplexed and puzzled the public; but Addison's quick eye detected at once the mockery which had escaped his more inattentive or more unsuspecting friend. This affair gave rise to an open feud between Pope and Philips, which was never healed. For many years Pope continued to make his unfortunate contemporary his butt; in particular, Philips's verses will be found to furnish, along with those of Blackmore, Theobald, and Welsted, the choicest specimens in the famous treatise of Martinus Scriblerus on the 'Art of Sinking in Poetry.' To all this persecution Philips had nothing to oppose but threats of personal chastisement, which had however the effect of making the satirist keep out of his way. Meanwhile his poetical reputation, which had previously been in a most flourishing condition, was undoubtedly very seriously damaged even by Pope's first insidious attack; he continued indeed to rhyme notwithstanding, but nothing which he produced after that paper in the 'Guardian' brought him much reputation. Conceiving himself to have a turn for simplicity and natural expression, he fell into a peculiar style of verse, in which the lines were very short, and the thoughts and phraseology approaching to the infantine; and this the public were taught to call 'Namby-pamby,' a name first bestowed, we believe, not, as has been stated, by Pope, but by Henry Carey, the clever author of 'Sally in our Alley' and 'Chrononhotonthologos,' a volume of poems published by whom in 1737 contained one so entitled in the form of a burlesque on one of Philips's productions. If the muses failed him however, Philips was consoled by the favour of his party and by considerable success as a politician. Soon after the accession of the House of Hanover, which fixed his Whig friends in power, he was made a commissioner of the lottery and one of the justices of the peace for Westminster, the latter, in those days, an appointment more lucrative than honourable. In 1721 he produced two more tragedies, 'The Briton,' and 'Humphrey, Duke of Gloucester,' both now forgotten. He next engaged in a periodical paper called 'The Freethinker,' in which one of his associates was Dr. Boulter, who was afterwards made bishop of Bristol and then archbishop of Armagh, and who, when he went over to Ireland, took Philips with him, and provided so well for him as to enable him to represent the county of Armagh in the Irish parliament. He at last rose to be judge of the Prerogative Court in Ireland; but resigned that place in 1748, and returned to his native country, where he died of a stroke of palsy, on the 8th of June, 1749.

PHILIPS, JOHN, was the son of Dr. Stephen Philips, archdeacon of Salop, and rector of Bampton in Oxfordshire, at which latter place he was born, in 1676. Having received his school education at Winchester, he was entered at Christ Church, Oxford, in 1694. It is said that he intended to follow the medical profession; but it does not appear that he pursued that object further than by engaging with much zeal in the study of botany and natural history. He first became known beyond his college, or university, by his poem entitled 'The Splendid Shilling,' which appeared in 1703. His intimate friend Edmund Smith says, in a fragment of a discourse on the works of Philips, which Dr. Johnson has printed, 'This poem was written for his own diversion, without any design of publication. It was communicated but to me; but soon spread, and fell into the hands of pirates. It was put out, vilely mangled, by Ben Bragge, and impudently said to be corrected by the author.' The 'Splendid Shilling' is a composition of the mock heroic kind, the verse being an imitation of that of Milton. Of course, it is absurd to contend, as has been done, that Philips here makes the little appear great, and is therefore to be distinguished from and set far above such parodists as only make the great appear little, as, for example, Cotton and Scarron. The truth is, that in both cases the great is made to appear little: what of piquancy there is in Philips's poem does not arise from any exaltation of the shilling, but from the application of the versification and expression of Milton to so mean a subject. In 1705 Philips produced his next poem, entitled 'Blenheim,' at the instigation, it is understood, of the Tory party, who wanted a poetical effusion on that victory to rival Addison's; but, notwithstanding an imitation of Milton of a more legitimate kind than in the 'Splendid Shilling,' Philips's 'Blenheim' found comparatively few admirers in that day, and has been generally forgotten since. His friend Smith attributes the general dislike of it partly to the circumstance of the author having been, like his prototype Milton, on the wrong side in politics, but principally to his readers having formed their taste upon French models, whence they had learned to admire points and turns, and consequently had no judgment of true greatness and majesty. Philips's chief work, his 'Cider,' a poem in two books, was published in 1706: like everything else that he wrote, it is in blank verse, and an echo of the numbers of 'Paradise Lost;' but, as a poetical composition, it belongs to the same class as Virgil's 'Georgics;' and consequently it is, as well as the 'Blenheim,' a serious, not a mock, imitation of Milton. Johnson says he was told by Miller, the eminent gardener and botanist, that there were many books written on the same subject in prose which do not contain so much truth as that poem. A complication of consumption and asthma put a period to the life of this amiable man, on the 15th of February, 1708, when he had just completed his thirty-second year. His friend and patron Sir Simon Harcourt, afterwards lord-chancellor, erected a monument to his memory in Westminster Abbey, which carries a long inscription in very flowing latinity, said by Johnson to be the composition of Bishop Atterbury, though commonly attributed to Dr. Friend. One passage is especially remarkable as expressing a notion of the perfection of verse, in which the writer of the inscription must have found himself widely at variance with the reigning taste of his day: Philips, he says, in the poetry he wrote in his native tongue, had learned, from the fountains of Greek and Roman song, to measure the harmony of verse 'rythmo . . . antiquo illo, libero, multiformi, ad res ipsas apto prorsus et attemperato, non numeris in eundem fere orbem redeuntibus, non clausularum similiter cadentium sono.' Curiously opposed to this stands the criticism of Johnson:—'Deformity is easily copied; and whatever there is in Milton which the reader wishes away, all that is obsolete, peculiar, or licentious, is accumulated with great care by Philips. Milton's verse was harmonious in proportion to the general state of our metre in Milton's age; and if he had written after the improvements made by Dryden, it is reasonable to believe that he would have admitted a more pleasing modulation of numbers into his work; but Philips sits down with a resolution to make no more music than he found—to want all that his master wanted, though he is very far from having what his master had. The asperities therefore that are venerable in the 'Paradise Lost,' are contemptible in the 'Blenheim.'' The insensibility which would have had Milton to take lessons in the music of verse from Dryden is startling enough; but there is justice in the contempt expressed for the mimetic Miltonism of Philips, who was without any true passion, or strength or elevation of fancy, and whose poetry in its most ambitious passages has little more than merely something in the sound to remind us of that of Milton.

PHILISTINES. [PALESTINE.]

PHILI'STION (Φιλιστίων), an antient Greek physician, the tutor of Eudoxus and Chrysippus. (Diog. Läert., *Vit. Philosoph.*, lib. viii., cap. 8, secs. 86 and 89.) He is called a Sicilian by Diogenes Läertius (lib. viii., sec. 86), but (if the same person be meant) he is said to have been an Italian by Rufus Ephesius (*De Corp. Hum. Part. Appell.*, p. 41, ed. Clinch), and a Locrian by Plutarch (*Sympos.*, lib. vii., quæst. 1, sec. 3), Aulus Gellius (*Noct. Att.*, lib. xvii., cap. 11, sec. 3), and Athenæus (*Deipnos.*, lib. iii., sec. 83, p. 115). He lived about the year 370 B.C, Ol. 102, 1. According to Plutarch and Aulus Gellius (*locis cit.*) he defended the opinion that part of what is drunk goes into the lungs, which is the more remarkable as Galen informs us that he was well skilled in anatomy. He belonged to the sect of the Empirici (Galen. *Subfig. Empir.* cap. i.), and was supposed by some persons to be the author of the treatise 'De Victu Salubri,' commonly attributed to Hippocrates. (Galen, *Opera*, tom. xv., p. 455; tom. xviii., A, p. 9, ed Kühn.) He is quoted several times by Pliny (*Hist. Nat.*, lib. xx., cap. 15, 34, 48, ed. Tauchn.); Oribasius (*De Machinam.* cap. iv.) attributes to him the invention of a machine for reducing luxations of the humerus; and (if the same person be meant) Athenæus (*Deipnos.*, lib. xii., sec. 12, p. 516) mentions him among those who had written on cookery (ὀψαρτυτικά).

PHILISTUS was a native of Syracuse, and a person of great wealth and influence. He was very intimate with the elder Dionysius, whom he assisted in obtaining the supreme power, B.C. 406; but having displeased the tyrant, he was banished from Syracuse. He retired to a city on the Adriatic Gulf, probably one of the Greek cities in southern Italy, and did not return to Syracuse till the accession of the younger Dionysius (Plutarch, *Dion.*, c. 11; Diod. Sic., xiii. 91), during whose reign the direction of public affairs appears to have been almost entirely in the hands of Philistus. When Syracuse was taken by Dion, B.C. 356, Philistus used great exertions in favour of Dionysius. He passed over into Italy, and procured from Rhegium alone 500 horse. After making an unsuccessful attempt upon Leontini, which had declared in favour of Dion, he joined Dionysius in the citadel, and was shortly after killed in a naval engagement, or, according to other accounts, was taken prisoner and put to death. (Plutarch, *Dion*, c. 35; Diod. Sic., xvi. 16.)

Philistus must have lived to a considerable age, since he was an eye-witness of the Athenian defeat at Syracuse, in B.C. 415, fifty-nine years before his death. (Plutarch, *Nic.*, c. 19.)

Philistus wrote a history of Sicily, which appears to have been a work of great merit, but of which we have only fragments. Cicero, in a letter to his brother (*ad Qu. Fr.*, ii. 13), speaks of the style of Philistus as brief and terse, and considers him as resembling though inferior to Thucydides; and in another passage (*Brut.*, c. 85) he also classes him with Thucydides, and says that these two writers were superior to all others. (Compare *De Div.*, i. 20; Quint., *Inst. Orat.*, x. i., p. 222, ed. Bipont.) The Sicilian history of Philistus was divided into two parts; of which the first contained seven and the second four books. (Diod. Sic., xiii. 103.) The first part embraced a period of 800 years, and terminated at the archonship of Callias and the battle of Agrigentum, that is, B.C. 406; the second part, which commenced at the point where the first terminated, contained the history of the elder Dionysius, and terminated at B.C. 363. (Diod. Sic., xv. 89; Clinton's *Fast. Hell.*, ii., p. 119.)

PHILLIPSITE, a mineral, the primary form of which is a right rhombic prism. It occurs crystallized only in macles which have much the appearance of harmotome; cleavage imperfect; fracture conchoidal; hardness 4·5. Scratches carbonate of lime. Colour white, flesh-red, or greyish. Streak white. Lustre vitreous. Transparent, translucent, opaque. Specific gravity 2·0 to 2·2.

This mineral occurs with gmelenite, in the county of Antrim, and at the Giant's Causeway; at Capo di Bove, near Rome; in Sicily; in the lavas of Vesuvius, and at Marburg in Hesse, &c.

Analysis of the mineral from the last-mentioned place, by Gmelin:—

Silica	.	48·02
Alumina	.	22·61
Potash	.	7·50
Lime	.	6·56
Water	.	16·75
		101·44

PHILLY'REA, the φιλλυρεα of Discorides, is a genus of Mediterranean evergreen shrubs, many varieties of which are cultivated in our gardens. They are much like the evergreen shrubs called Alaternus, from which however they are readily known by their leaves being opposite, not alternate. Some botanists regard them as species of olive, to the fruit of which that of the Phillyrea has much resemblance. The hardiest and handsomest variety is *P. obliqua*, the most tender and the least beautiful is *P. angustifolia*.

PHILO (Φίλων), the name of several antient physicians, though it is difficult to determine exactly how many. Fabririus (*Biblioth. Græca*) supposes four, of whom the most eminent was the author of the celebrated antidote called, after his name, Philonium. He left behind him directions for composing this medicine in a short Greek poem, of twenty-six lines, written in a very enigmatical style, which, together with an explanation of it, may be seen in Galen. (*De Compos. Medicam.*, κατὰ τόπους, lib. ix., cap. 4, p. 267, ed Kühn.) It seems to have been something like the Mithridate, the Theriaca, and the Hiera Archigenis, and was, as Galen tells us, one of the most antient as well as one of the most esteemed of this kind of medicines. Philo was born at Tarsus in Cilicia (Galen, *loco cit.*), and is supposed to have lived about the beginning of the Christian æra.

Another physician of this name, probably contemporary with Plutarch, in the second century A.D. is quoted by him (*Sympos.*, lib. viii., quæst. 9, sec. 1) as having said that Elephantiasis first appeared shortly before his time. In this opinion however he is probably mistaken. See a treatise by Jul. Alb. Hofmann, entitled 'Rabiei Caninæ ad Celsum usque Historia Critica,' Lips., 1826, 8vo., p. 53.

PHILO JUDÆUS, that is, Philo the Jew, was a native of Alexandria. The precise time of his birth is unknown; but he represents himself as of advanced age about A.D. 40, when he was sent as chief of an embassy from the Jews of Alexandria to the emperor Caligula, for the purpose of pleading their cause against Apion, who charged them with refusing to pay due honours to Cæsar. He went again to Rome in the reign of Claudius, and after this nothing is known with certainty about him.

Philo had a brother employed in the affairs of government at Alexandria, named Alexander Lysimachus, who is supposed to be the Alexander mentioned in *Acts*, iv. 6, as a man 'of the kindred of the high-priest.' That Philo was a member of the sacerdotal family is asserted by Eusebius and others, and his own writings indirectly testify that such was the fact. There is also reason to believe that he belonged to the sect of the Pharisees.

Philo was eminent for his learning and eloquence. To the attainments usually made by the Jews of his condition, he added an extensive knowledge of the Greek philosophy, and especially of that of Plato. He has been represented by Scaliger and Cudworth as ignorant of Jewish literature and customs; but Fabricius and Mangey have clearly shown that such representation is entirely groundless.

As an interpreter of the Jewish scriptures, he is fond of allegorising, a species of interpretation which had long prevailed at Alexandria. That Philo was a follower of Plato in philosophy there can be no doubt; but it must not therefore be concluded that his style is Platonic or his language Attic. He writes well indeed, but still as an Alexandrian Jew. Mangey styles him 'the chief of the Jewish, and not much inferior to the Christian writers.'

The principal editions of Philo are those of Geneva, 1613; Paris, 1640; Mangey, London, 1742; Richter, Leipzig, 1828-1830.

Mangey's edition, in two vols. folio, was printed by the learned William Bowyer. It is a splendid book, and does great honour to the English press. The works of Philo, as they are here presented, amount to forty-seven treatises, with six fragments, upon subjects mostly referring to the Jewish religion. The arrangement of these treatises appears to be arbitrary, and it would perhaps be impracticable to reduce them to order. This edition contains two treatises not before published, one on the 'Posterity of Cain,' from a MS. in the Vatican Library; the other on the 'Last Three Commandments,' from a MS. in the Bodleian. It is dedicated to Archbishop Potter, and a valuable preface follows the dedication.

Richter's edition, in 8 vols. small 8vo., follows Mangey's text, but does not give the Latin version. It contains two more tracts of Philo, on the 'Feast of the Basket' and on 'Honouring Parents,' which tracts Angelo Mai discovered in the Laurentian Library at Florence, and published with a Latin version, at Milan, in 1818. Richter's edition contains moreover a Latin translation of seven treatises of Philo existing in an Armenian version, supposed to have been made in the fourth or fifth century, and published in Armenian and Latin by John Baptist Aucher, at Venice, in 1822 and 1826.

Richter's publication is printed with great care, and may be pronounced the most complete and useful edition of Philo.

An ample account of Philo and his writings may be found in the 'Bibliotheca Græca' of Fabricius, and in Mangey's preface, whose materials are derived from Josephus, Justin Martyr, Clemens of Alexandria, Eusebius, Jerome, and others, including of course Philo himself. On the additional publications of Mai and Aucher, see *British Critic and Quarterly Theological Review*, vol. v., 1829.

PHILO. Many other Philos are named; but as they do not appear worthy of particular notice, it may suffice to state that a catalogue of them, to the number of more than forty, is given in the third volume of the 'Bibliotheca Græca' of Fabricius.

PHILODE'MUS was an Epicurean philosopher and poet, and is mentioned by Cicero and Horace. Fragments of his epigrams are in the Greek Anthology. (Fabricius, *Bibliotheca Græca.*)

PHILOLA'US, a native of Crotona, flourished about B.C. 374. He was a Pythagorean, a disciple of Archytas, and the first who wrote on the subject of physics. It is said that Plato bought, at an enormous price, three books of Philolaus, with the aid of which he composed his 'Timaeus.' In several antient writers quotations are made from Philolaus. (Fabricius, *Bibl. Græca.*)

PHILO'LOGY (φιλολογία). It is difficult to attach a precise meaning to this word, as it is used in different significations by different writers. Among the Greeks and Romans, the term philology was originally used to signify a love for the investigation of all subjects connected with literature. (Plat., *Theaet.*, c. x., p. 146; c. xlvii., p. 161; Cic. *ad Div.*, xvi. 21; Ernesti, *Clavis Ciceron.*, under φιλολογώτερα.) The Alexandrine critics applied the term philologus to a person who was well acquainted with the antient Greek writers and with the subjects treated of in their works; and we learn from Suetonius (*De Illustr. Grammat.*, c. 10) that Eratosthenes, who lived in the second century before the Christian æra, was the first who obtained this name, in consequence of his extensive and varied learning. In later times, a philologus was merely a person skilled in language, and the word became almost synonymous with grammaticus.

Some modern writers have included under the term philology the study of Greek and Roman antiquities, but the majority of writers appear to regard the study of the theory of language and of languages in general as the only subjects strictly belonging to philology.

The reader who wishes further information respecting the different meanings attached to the word philology, may consult Ast's 'Grundriss der Philologie,' Landshut, 1808, and the first essay in Wolf and Buttmann's 'Museum der Alterthums-Wissenschaft,' Berlin, 1807.

PHILOME'LA. [NIGHTINGALE; SYLVIADÆ.]

PHILOMELI'NÆ. [SYLVIADÆ.]

PHILOME'LUS. [PHOCIS.]

PHILOPŒMEN, the son of Craugis or Crausis of Megalopolis in Arcadia, was born about 253 B.C. Having lost his father when he was still a boy, he was educated by Cleander of Mantineia, an intimate friend of Crausis. He was afterwards placed under the tuition of Ecdemus and Demophanes, two distinguished citizens of Megalopolis and friends of Aratus. Philopœmen studied philosophy and the art of war, of which he was very fond from early youth: 'he considered it,' as Plutarch says, 'the most important and useful occupation of men, and despised those who were not versed in it.' When he attained the age of manhood, he engaged in predatory incursions which the people of Megalopolis, the constant enemies of Sparta, made into Laconica. In his leisure he applied himself to agricultural pursuits for the purpose of improving his paternal estate.

Philopœmen was thirty years of age when Cleomenes, king of Sparta, surprised Megalopolis by night [CLEOMENES' III.], and he was one of the last to leave the town. Some time after, the Achæans, in order to oppose Cleomenes, having by the advice of Aratus allied themselves with Antigonus Doson, king of Macedonia, that prince came into Peloponnesus, and defeated Cleomenes at the battle of Sellasia, 222 B.C., to which victory Philopœmen mainly contributed. He received a severe wound in this battle. His reputation now rose high, and he was offered by Antigonus a command in his army, which he declined, 'because,' says Plutarch, 'he could not bear to be under the direction of another.' Philopœmen now repaired to Creta, and engaged as a volunteer in the war which distracted that island. During this campaign he greatly improved himself in strategy. Aratus died B.C. 213, and Philopœmen, on his return home, was made general of the Achæan cavalry. He improved the discipline of that body, recruited its strength, and made it completely efficient. In a battle which was fought near the river Larissus, he defeated the united Ætolians and Eleans, and killed with his own hand Demophantus, the Elean general. He also effected many improvements in the tactics and discipline of the Achæan infantry, and introduced the Macedonian order of battle. War having broken out between the Achæans and Machanidas, tyrant of Sparta, Philopœmen marched against the Spartan, and defeated him near Mantineia. Machanidas fell in the battle, by the hand of Philopœmen. In consequence of this exploit, the Achæans voted him a statue of bronze, which was placed in the temple of Delphi. In 201 B.C. Philopœmen was made strategos, or captain-general, of the Achæan league, of which, from that time till his death, he was considered as the principal leader, having succeeded Aratus in the confidence of the people. Philopœmen being a great obstacle in the way of Philip of Macedonia, who wished to extend his sway over the independent states of Greece, the king tried to have him assassinated, but the plot was discovered, and only served to increase the influence of Philopœmen. Nabis, who had succeeded Machanidas as tyrant of Sparta, seized Messenia, but Philopœmen drove him out of that country, and restored the Messenians to their independence as allies of the Achæans. Wanting employment at home, he went a second time to Crete at the request of the Gortynians, and served in the wars of that island. Returning home about 197 B.C., he found Philip beaten by the Romans under Flamininus, and obliged to sue for peace, the Achæans allied to Rome, and Nabis at war both with the Achæans and with Rome. Philopœmen equipped a fleet against Nabis, but he failed in his naval operations. He then attacked him by land and defeated him; and Gythium and the other seaports of Laconica, being taken from Nabis, were occupied by Achæan garrisons under an agreement with Flamininus, the Roman commander. When Nabis was murdered by his Ætolian auxiliaries, 192 B.C., Philopœmen marched upon Sparta, which was in a state of great confusion, and obliged the citizens to join the Achæan League, which then included all the Peloponnesus, with the exception of Elis.

During the subsequent war between Antiochus and the Romans, Philopœmen, who was more clear-sighted than most of his countrymen with respect to the ambitious policy of Rome, recommended caution, and observed to Diophanes, who was then strategos of the Achæans, that 'while Antiochus and the Romans were contending with two such powerful armies in the heart of Greece, the duty of an Achæan general was to watch them attentively, and, instead of lighting up a fresh war at home, rather to overlook some real injuries.' This referred to Diophanes' marching against Sparta, which had withdrawn itself from the league. Some time after however the citizens of Sparta, impatient at being cut off from the sea-coast, attempted to surprise a seaport called Las, but were repulsed by the Achæans, joined to the Lacedæmonian emigrants who had been exiled by Nabis. The Achæans passed a decree requiring Sparta to give up the authors of the attempt upon Las. The pride of the Spartans was roused; they refused compliance, put to death several of their countrymen who were in favour of the Achæans, and sent envoys to the Roman Proconsul Fulvius, who had just effected the subjugation of the Ætolians, 189 B.C. Philopœmen, who was strategos of the Achæans for that year, devastated Laconica. Fulvius came into Peloponnesus, and advised both parties to send messengers to Rome, and to suspend hostilities. The Achæans sent Diophanes and Lycortas, the father of the historian Polybius. The senate returned an ambiguous answer, which the Achæans interpreted in their favour; and Philopœmen, being re-elected strategos for the following year, 188 B.C., marched into Laconica, and again demanded the authors of the attack upon Las and of the withdrawal from the Achæan alliance, with a promise that they should not be punished without trial. Upon this several of the persons implicated in this affair came forward and went voluntarily to the Achæan camp, accompanied by others of the principal citizens of Sparta. As they approached the Achæan camp, the emigrants who formed the Achæan advanced-guard fell upon their own countrymen, and killed seventeen of them, when Philopœmen interfered and saved the rest (sixty-three in number) from immediate destruction. The next day he brought them before the assembled Achæans and Lacedæmonian emigrants, and, after a mock trial, they were sentenced to death and executed. The Spartans in dismay submitted to Philopœmen, who dictated to them hard conditions, namely, that the walls of the town should be razed, that all emigrants should be restored, that all the mercenary troops should quit Laconica, as well as all the slaves who had been emancipated by Nabis and other tyrants. About 3000 of these refusing to leave the country, Philopœmen sold them, and applied the money thus produced to rebuilding a portico in Megalopolis which had been destroyed by Cleomenes. But the hardest condition which Philopœmen imposed upon Sparta was that of abolishing the laws and discipline of Lycurgus, and obliging the Spartans to adopt the institutions of the Achæans and bring up their children after the Achæan fashion, being convinced, says Plutarch, 'that their spirit could never be humbled so long as they adhered to their old institutions.' Thus, in the year 188 B.C., the laws of Lycurgus were abrogated, after having subsisted for seven centuries, during which Sparta had maintained a proud station among the states of Greece. It is true that for a long time previous to their abrogation they had been ill observed, but still they existed, at least in name, and it required only a determined spirit like that of Cleomenes to enforce obedience to them. The Spartans again appealed to Rome, and the consul Q. C. Metellus, on his return from Macedonia, where he had been on an embassy, appeared before the council of the Achæans assembled at Argos, and complained that they had treated the Spartans with undue severity. Aristænus, the Strategos for the year, was in the Roman interest, and Diophanes also blamed the conduct of Philopœmen; but Lycortas defended his conduct, and the council resolved that the decree concerning Sparta should not be repealed. It was perhaps on this occasion that Philopœmen, indignant at the servility exhibited by Aristænus towards the Romans, is reported by Plutarch to have exclaimed, 'And why in such haste, wretched man, to see an end of Greece?' Envoys were sent to Rome by the Achæans to justify their conduct, and the Spartans, on their side, sent two of the restored exiles, who took a violent part against the Achæans. The senate, having heard both parties, sent Appius Claudius and others as commissioners to the Peloponnesus. A general congress of the Achæans being called, Appius Claudius declared that the senate was displeased with the manner in which Sparta had been treated, the massacre of eighty of its citizens, the demolition of its walls, and the abrogation of the laws of Lycurgus. It was on this occasion that Lycortas made that eloquent speech in reply which is given by Livy (xxxix. 36, 37), in which, after defending the conduct of the Achæans, he retorted upon the Romans their own conduct towards the free state of Capua during the second Punic war. The speech of Lycortas was generally approved; 'so that,' adds Livy, 'it was easy for Appius to see that the dignity of Rome could not be upheld by gentle proceedings.' Accordingly Appius haughtily advised the Achæans to do with a good grace that which otherwise they would be obliged to do against their will. The congress then declared, that rather than reverse their own decrees, they left it to the senate to make what changes they thought proper. The senate, seemingly satisfied with this submission, allowed Sparta to continue in the Achæan league, on the condition of a general amnesty and the restoration of all political exiles.

In the year beginning May, 183 B C., Philopœmen, then seventy years of age, was elected strategos for the eighth time. About this time Messene, through the influence of one of its citizens named Dinocrates, threw off its alliance with the Achæans. It appears from some passages of Polybius that Dinocrates was a friend of Flamininus, the Roman general, who had been just appointed ambassador to Prusias, king of Bithynia, to demand of him the person of Hannibal. Flamininus on former occasions had shown that he was no friend to Philopœmen, and indeed the personal character of the latter made him obnoxious to the Roman policy. Flamininus, on arriving at Naupactus, wrote to Philopœmen, requesting him to call together a general congress of the Achæans to discuss the affairs of Messene. Philopœmen, knowing that he had no instructions from the senate for the purpose, declined to do so, and prepared for war against Messene. He marched with a body of cavalry, but finding a stout resistance, he was obliged to fall back. Being the last to retire, he was surrounded by the enemy, thrown from his horse, wounded in the fall, and taken prisoner to Messene. The citizens of Messene felt for his age and his misfortune, but a few of the leading men of the faction of Dinocrates determined on getting rid of him. They put him in a dark dungeon called 'the Treasury,' and in the night they sent the executioner to him with a cup of poison. Philopœmen asked the man whether he knew what had become of the Achæan cavalry, and especially of his friend Lycortas? The man answered that they had retired in safety. 'Then we are not altogether unhappy,' observed the aged general, and he took the cup and drank the poison, which soon put an end to his life (182 B.C.). The news spread rapidly through Achæa. Lycortas, being appointed strategos, marched to avenge the death of his friend. The Messenians opened their gates, Dinocrates killed himself, and the remains of Philopœmen being burned, the ashes were collected in an urn, which was carried by young Polybius in solemn procession of the Achæan army to Megalopolis. The Messenian prisoners who had been concerned in the death of Philopœmen were stoned to death. Statues to his honour were set up in most Grecian cities. Philopœmen has been styled by some the last of the Greeks: he was certainly the last of their successful commanders.

(Plutarch, *Philopœmen;* Polybius, xxiii.; *Fragments,* xxiv. 5; Livy, xxxix.)

PHILO'SCIA. [Isopoda, vol. xiii., p. 55.]

PHILOSOPHY, from the Greek *philosophia* (φιλοσοφία), literally signifies 'love of wisdom or knowledge,' and a philosopher (φιλόσαφος) is a 'lover of wisdom.' Pythagoras (Diog. Laert., *Proœm.*) is said to have first used the term philosophy, and to have called himself a philosopher, instead of a sophus (σόφος), or 'wise man,' for, he added, no one is wise but God. Among the Greeks, philosophy was sometimes viewed as comprising or consisting of three parts, physic (φυσικόν), ethic (ἠθικόν), and dialectic (διαλεκτικόν). Physic treated of the universe and that which it contained; ethic treated of things that concerned human life and man. The term dialectic is explained in the article Organon. This division of philosophy is in itself of no value, and is merely a matter of history.

The terms philosophy, philosophical, philosopher, are often used in our own language apparently with no great precision, though it is not difficult to deduce from the use of these terms the general meaning or notion which is attached to them. We speak of the philosophy of the human mind as being of all philosophies that to which the name philosophy is particularly appropriated; and when the term philosophy is used absolutely, this seems to be the philosophy that is spoken of. Other philosophies are referred to their several objects by qualifying terms: thus we speak of natural philosophy, meaning thereby the philosophy (whatever that word may mean) of nature, that is, as the term nature is generally understood, of material objects. We also speak of the philosophy of positive law, understanding thereby the philosophy of those binding rules, properly called laws. The terms philosophy of history, philosophy of manufactures, and other such terms, are also used. All objects then which can occupy the mind may have something in common, called their philosophy; which philosophy is nothing else than the general expression for that effort of the mind whereby it strives, pursuant to its laws, to reduce its knowledge to the form of ultimate truths or principles, and to determine the immutable relations which exist between things as it conceives them. The philosophy which comprises within itself all philosophies is that which labours to determine the laws or ultimate principles in obedience to which the mind itself operates; and both those laws or ultimate truths, which must be considered as constituting the mind what it is, and which are therefore independent of all external impressions, and those laws by which the mind operates upon the sensuous impressions produced by objects which it conceives and can only conceive as being external to itself.

Thus every kind of knowledge, the objects of which are things external, has its philosophy or principles, which, when discovered and systematised, form the science of the things to which they severally belong. But inasmuch as the mind, in striving after this science, must act by its own laws and powers, and as these must in their form, viewed independently of their special objects, always be the same laws and powers (for we cannot conceive the mental powers to vary or differ in their essential qualities merely because they are applied to things that are conceived as different), we therefore assume that the mind has its laws and powers, which may be discovered by observation, as we discover by observation the laws or principles which govern the relations of things external to the mind, or conceived as external. Thus the human mind, by the necessity imprinted upon it, seeks to discover the ultimate foundation of all that it knows or conceives; to discover what itself is, and what is its relation to all things. Accordingly it strives to form a system out of all such ultimate laws or principles. Such a system may be called a philosophy, in the proper and absolute sense of the term, and the attempt to form such a system is to philosophise. Systems of philosophy have existed in all nations; even in the most uncivilised, in some form, and particularly in the form of a religion; for the highest aim of philosophy is to ascertain the relation of man to the infinite Being whom he conceives as the end and limit of all his inquiries. In nations which have made further progress in mental culture, the systems of philosophy are not limited to the dogmas of a religion, but those who have leisure, and whose minds have been disciplined, have in all ages ventured to transcend the limits of the religious system of their society or age, and to form what are called philosophical systems. The history of such systems is the history of philophy, which thus viewed is a history of the progress of the human mind towards the knowledge of itself, a knowledge which, imperfect as it is, is the accumulation of many centuries, and the work of many contributors.

PHILOSTO'RGIUS, a native of Cappadocia, born A.D 364, came to Constantinople to complete his studies, and afterwards wrote a History of the Church, in twelve books, from the beginning of the schism of Arius, to A.D. 425. The work is lost, but we have an epitome of it by Photius, independent of a short notice of it in his 'Bibliotheca.' (*Myriobiblon*, Cod. 40.) Photius inveighs against the author as a heretic, and an apologist of Arius, Eusebius of Nicomedia, Apollinaris, and other heretics. Philostorgius was a man of general information, and he inserted in his narrative many geographical and other details of remote countries, especially of Asia and Africa. The author was rather credulous with regard to prodigies, monsters, and other wonderful things, and Photius censures his credulity in attributing miracles to those whom the Patriarch considered as heretics. The epitome was translated into Latin, with comments, by J. Gothofredus, 4to., Geneva, 1642, and also by H. de Valois, 'Compendium Historiæ Ecclesiasticæ Philostorgii, quod dictavit Photius Patriarcha,' Paris, 1673, with notes. It has also been translated into French: 'Abregé de l'Histoire de l'Eglise de Philostorge,' Paris, 1676.

PHILO'STRATUS, FLAVIUS, a native of the island of Lemnos, born in the second half of the second century of our æra, taught rhetoric first at Athens and afterwards at Rome, where he became known and was patronised by the empress Julia, the wife of Septimius Severus, who was partial to the learned. She commissioned him to compile the biography of Apollonius of Tyana from some memoirs written by a certain Damis of Nineveh, who had accompanied Philostratus in his peregrinations, and which had come into her possession. Philostratus professes also to have used in his compilation a collection of letters of Apollonius, which were at one time in the possession of Hadrian, and were placed by that emperor in his palace at Antium, together with certain responses of the Oracle of Trophonius, which Apollonius had also collected. The biographer availed himself also, according to his own statement, of the narrative of a certain Maximus who had known Apollonius. [APOLLONIUS OF TYANA.] The book of Philostratus displays great credulity, either real or affected, in the compiler, and a great want of critical discrimination; it also contains many anachronisms and geographical errors. Huet and others have imagined that the object of Philostratus was to write a parody of the life of Christ, but this seems doubtful: the parody, if intended as such, is too gross; besides which, it appears from the testimony of Lampridius (*Life of Alex. Severus*), that Christ was really worshipped by some of the later heathen emperors, together with Abraham, Orpheus, and Apollonius, these being all looked upon as holy men and tutelary genii. That Apollonius of Tyana was a real character, a philosopher, and a traveller, appears from various passages of antient authors. Vopiscus, among others, in his Life of Aurelian, says that his statues were in many temples; but his adventures were probably magnified and distorted in course of time, and it is remarkable that no one mentions him until nearly a century after the time assigned for his death. The empress Julia, a Syrian by birth, was probably fond of the marvellous, and Philostratus, intending to entertain her, inserted in his book all the wonderful stories he could collect relative to his hero. It seems however that in the time of the great struggle between the heathen and Christian religions, under Diocletian and his immediate successors, some of the heathen writers thought of availing themselves of the Life of Apollonius as a kind of counterpoise to the Gospel narrative. Hierocles, prefect of Alexandria, and an enemy of the Christians, wrote a book with that object, in the shape of a comparison between the Life of Apollonius by Philostratus and that of Christ, of which book Eusebius wrote a refutation: 'Eusebii Pamphili Animadversiones in Philostrati de Apollonio Tyanensi Commentarios ob institutam cum illo ab Hierocle Christi comparationem, adornatæ.' Lactantius (*Divin. Instit.*, v. 3) also combats the same notion as absurd. St. Augustin (*Epist.* 4) alludes to Apollonius as a magician whom the heathens compared with Christ. (See Tillemont, *Hist. des Empereurs Romains*, vol. ii., and Bayle's article 'Apollonius de Tyane.')

The other works of Philostratus are: 1, 'The Lives of the Sophists,' in two books; 2, 'Heroica,' or comments on the lives of some of the heroes of Homer, in the shape of a dialogue; 3, 'Icones,' or descriptions of 64 paintings which were in a portico near Neapolis by the sea-shore (these descriptions contain valuable information concerning the state of antient art); 4, Epistles, mostly erotic, excepting a few on matters of literature: one, which is inscribed to Julia Augusta, is an apology for the sophists. Philostratus wrote other works, such as a 'Lexicon Rhetoricum,' orations, &c., which are lost. His nephew, who is styled Philostratus the Younger, and who lived under Macrinus and Elagabalus, wrote also a book of 'Icones,' which are not descriptions of actual paintings, but are so many subjects proposed to painters.

Olearius published all the existing works of the two Philostrati, with a Latin version, fol., Leipzig, 1709, including also some letters attributed to Apollonius and the work of Eusebius against Hierocles. The 'Heroica' of Philostratus were edited by Boissonade, Paris, 1806, 8vo., upon a collation of nine MSS. An edition of the 'Icones' of both the Philostrati appeared at Leipzig, 1825, 8vo., with a commentary by F. Jacobs, and notes by F. G. Welcker.

PHILO'TAS. [PARMENIO.]

PHILO'XENUS, a native of Eretria, was the pupil of Nicomachus of Thebes, whom he imitated, and even surpassed in rapidity of execution: he is said by Pliny (*Hist. Nat.*, xxxv. 10, 36) to have discovered some more expeditious methods of operation in painting. He was the most rapid painter of antiquity, the 'Fa presto' (Luca Giordano) of the antients.

Philoxenus was particularly distinguished for a Battle of Alexander and Darius, which, according to Pliny, was not inferior to any of the productions of antient painting. It was painted by order of Cassander, king of Macedon, and therefore probably not long after the hundred and sixteenth Olympiad, or 316 B.C.

It is not improbable that the large mosaic, apparently representing the battle of Issus, which was discovered in the year 1831, in Pompeii, in the so-called house 'del Fauno,' and is still preserved there, is a repetition of the celebrated picture by Philoxenus of that subject; for, independent of Alexander and Darius being the two most conspicuous figures, the design and composition of the work are so superior to the execution, that its original has evidently been the production of an age long anterior to the degenerate period of the mosaic itself. With the single exception of the execution, the mosaic exhibits, in every respect, merits of the highest order, and is certainly one of the most valuable relics of antient art: the composition is simple, forcible, and beautiful, and its original, if not actually a production of the most renowned times of Grecian painting, still cannot have been far short of meriting the commendation bestowed by Pliny upon the battle-piece of Philoxenus.

Pliny has mentioned only two works by Philoxenus, the one alluded to, and a lascivious piece, in which were three satyrs feasting, a style of art much in vogue with Grecian painters, even of the best days.

PHILTER (φίλτρον, *philtrum*), was a potion given among the Greeks and Romans to excite love. It is doubtful of what these potions were composed, but their operation was violent and dangerous, often depriving those who drank them of their reason. (Ovid, *Ar. Amat.*, ii. 106.) Lucretius is said to have died from drinking a potion of this kind, and the madness of Caligula is attributed by some to a similar potion, which was given him by his wife Cæsonia. (Suet., *Cal.*, 50; Juv., vi. 615, 616.) The most powerful love potions were prepared by the Thessalians, whence Juvenal speaks (vi. 610) of Thessala philtra.

PHI'LYRA, Fabricius's name for a genus of the tribe of *Leucosians*. [OXYSTOMES, vol. xvii., p. 110.]

The *Philyræ* are small crustaceans, with a circular and depressed *carapace*, the *front* of which is much less advanced than the epistome. The *external antennæ* are nearly transversal in flexion, and the buccal frame is nearly circular anteriorly; the principal portion of the external jaw-feet is triangular, as in the other Leucosians, but the palp or external branch of those organs is much dilated outwards, and describes a very curved line. *Feet* of the four last pairs with the tarsus depressed and nearly lamellar. Nothing else remarkable. (M. Edwards.)

Example, *Philyra scabriuscula.* (Pl. to M. Edwards's *Hist. Nat. des Crustacés*, pl. 20, figs. 9 and 10.) Colour rosy grey; length six lines.

Locality.—East Indies.

PHLEGM is the mucus secreted by the air passages. [MUCUS.] In its common acceptation the term includes nearly all materials coughed up from the lungs.

PHLEGON (Φλέγων), a native of Tralles in Lydia (Suidas), a freedman of the emperor Hadrian. (Vopiscus, *in Saturnino*, p. 245; Spartianus, *in Hadriano*, p. 8, et *in Severo*, p. 71, ed. Salmas., Par., 1620; Photii *Biblioth.*, cod. 97, p. 83, ed. Bekker.) Nothing is known of the events of his life, and the date of his death is uncertain: however, as one of his chronological works, which is no longer extant, carried the history down to Ol. 229.2—A.D. 141 (Suidas), he probably lived to the middle of the second century A.D. Some fragments of his works are all that remain; the longest belongs to a treatise *περὶ θαυμασίων*, 'De Mirabilibus.' It is a curious work, divided into thirty-five chapters (some of which are very short), and containing (as might be expected from the title) a great many absurd fables. The same may be said of a shorter fragment of four chapters, *περὶ μακροβιών*, 'De Longævis.' The third fragment that remains is a chapter *περὶ τῶν* 'Ολυμπίων, 'De Olympiis,' which is supposed by Salmasius (*Ad Spartian.*, p. 43) to be the preface to a lost work, 'De Olympionicis.' He mentions (*De Mirab.*, capp. 6-10) several curious cases of hermaphrodites (*ἀνδρόγυνοι*), or persons supposed to be women who afterwards turned out to be men. (For similar instances see *Cyclop. of Anat. and Physiol.*, art. 'Hermaphroditism,' p. 692, &c.) He quotes Craterus, the brother of King Antigonus (*De Mirab.*, cap. 32), as saying that he had known a person who, within seven years, was an infant, a youth, an adult, a father, an old man, and a corpse. (For similar instances see Good's *Study of Med.*, cl. v., ord. 2, gen. 2, sp. 1.) He gives several instances of monstrous births, and of three, four, and five children being born at once, and says, on the authority of Megasthenes, that the women at Palæa become mothers at six years old. (*Ibid.*, cap. 33.) He gives a list of persons who had lived more than a hundred years, but says that the Erythræan sibyl attained nearly the age of one thousand. (*De Longæv.*, cap. 4.) He speaks of a child who was able to converse with others when only nine-and-forty days old. (Steph. Byzant., *De Urb. in* Ταρραχίνῃ.)

But what has made Phlegon's name more familiar among the moderns is his being cited, though a heathen, as bearing witness to the accomplishment of Christian prophecies. (Origen, *Cont. Cels.*, lib. ii., § 14, p. 69, ed. Spencer., Cantab., 1677.) The passage referred to is as follows:—'Phlegon, in the thirteenth, or, as I think, the fourteenth book of his Chronicles, ascribes to Christ the knowledge of some future things, though he makes a mistake in the person, naming Peter instead of Jesus; and he allows that the things foretold came to pass.' Upon this Lardner remarks (*Credibility*, Pt. II., 'Heathen Testimonies,' ch. 13)—1, that Origen seems to have trusted to his memory in this quotation; 2, that if Phlegon named Peter instead of our Lord, it is a mark of carelessness and inaccuracy; 3, that, for want of seeing the passage more at length, we cannot form any clear judgment about it; 4, that Phlegon was so credulous, that his testimony concerning things of a marvellous nature must be of little weight; and 5, that Origen is the only person that has mentioned this. He concludes therefore that 'upon the whole this citation is of no great moment.' But there is another passage of this author which may be reckoned more material, as it has been supposed to relate to the miraculous darkness which prevailed at the time of our Lord's crucifixion. In St. Jerome's Latin version of the 'Chronicle' of Eusebius (p. 155, ed. Pont., Burdig., 1604), the passage occurs as follows:—'And so writes Phlegon, an excellent compiler of the Olympiads, in his thirteenth book, saying, "In the fourth year of the two hundred and second Olympiad there was a great and extraordinary eclipse of the sun, distinguished among all that had happened before. At the sixth hour the day was turned into dark night, so that the stars in the heavens were seen, and there was an earthquake in Bithynia which overthrew many houses in the city of Nice."' (Compare Origen, *Cont. Cels.*, lib. ii., § 33, p. 80; *Ib.*, § 59, p. 96; and other authorities quoted by Lardner.) This passage was the origin of a controversy in England in the early part of the last century between Mr. Whiston, Dr. Sykes, Mr. Chapman, and others, a long and complete account of which may be found in the English translation of Bayle's Dictionary, and in Chaufepié's Supplement to it. The immediate cause of the controversy was the omission of the passage in the eighth edition of Dr. S. Clarke's 'Boyle Lectures,' published soon after his death in 1732, although it had been inserted in the first edition, which came out in 1706. This was done at the persuasion of Dr. Sykes, who had suggested to Clarke that an undue stress had been laid upon the passage. But besides these, other and greater names are to be found in direct opposition to each other upon this question. The testimony of Phlegon is highly valued by Colonia (*La Relig. Chrét. autorisée par les Aut. Pay.*, vol. i., ch. 1, pp. 1-44); by Huet (*Demonstr. Evang.*, prop. 3, § 9, pp. 25-6); by Fabricius (*Bibliog. Gr.*, tom. iii., p. 403); by Petavius (*De Doctr. Temp.*, lib. xii., cap. 21, p. 458): on the other hand, it is rejected by G. J. Vossius (*Harm. Evang.*, lib. ii., cap. 10); by Scaliger (in Euseb. *Chron.* pp. 185-6); by Kepler (*Ecl. Chron.*, pp. 87, 126); by Tillemont (*Mém. Eccles.*, Note xxxv., sur N. S. Jesus Christ, p. 449); by Bayle (*Dict. Hist. and Crit.*, art. 'Phlegon'); and by Lardner (*loco cit.*). The principal objections against the authority of the passage in question are thus briefly summed up by Dr. Adam Clarke (*Comment. on Matth.* xxvii. 45):—1, All the authors who quote Phlegon differ and often very materially, in what they say was found in him; 2, He says nothing of *Judæa*: what he says is, that in such an Olympiad (some say the 102nd, others the 202nd) there was *an eclipse in Bithynia*, and *an earthquake at Nice*; 3, He does not say that the earthquake happened at the time of the eclipse; 4, He does not intimate that this *darkness* was *extraordinary*, or that the eclipse happened at the *full of the moon*, or that it lasted *three hours*; all of which circumstances could not have been omitted by him if he had known them; 5, He speaks merely of an ordinary though perhaps total eclipse of the sun, and cannot mean the darkness mentioned by the Evangelists; and 6, He speaks of an eclipse that happened in some year of the 102nd or 202nd Olympiad, and therefore, upon the whole, little stress can be laid on what he says as applying to this event.

The three remaining fragments of Phlegon were first published in 1568, Basil., 8vo., Gr. et Lat., by Xylander, together with Antonini Liberalis *Transform. Conger.*; Apollonii *Hist. Mirab.*; Antigoni Carystii *Hist. Mirab.*; and M. Antoninus, *De Vitâ suâ.* An improved edition, with notes by Meursius, appeared in 1620, Lugd. Bat., 4to., Gr. et Lat., which is reprinted by Gronovius, in his 'Thesaur. Antiquit. Græc.,' vol. viii., p. 2690, sq., and p. 2727, and vol. ix., p. 1289, sq.; and also inserted among the works of Meursius, vol. vii., p. 77, sq. This was republished with notes by J. G. Franzius, and an 'Epistola de Longævis,' by Meibomius, Halæ, 1775, 8vo., and lastly, with additional observations, by J. Bastius, Halæ, 1822, 8vo., Gr. et. Lat.

PHLEGRÆI CAMPI, the antient name given by poets to a volcanic hilly region situated west of the city of Naples, embracing the not yet extinct volcano called La Solfatara, the basins of the lakes of Agnano and Averno, the extinct crater called Degli Astruni, that called Monte Barbaro, and the hill called Monte Nuovo, which was thrown up by an eruption in 1538 on the site of the former lake Lucrinus [AGNANO; AVERNO]; in short, the whole district round Pozzuolo, bounded on the east by the hill of Posilipo, which separates it from the basin of Naples Proper, and Mount Gaurus and Mount Grillo on the west and southwest, which divide it from the coasts of Cumæ and Baiæ. [BAIÆ; CUMÆ.] On the north this volcanic district is bounded by the plain of Campania. It must not be supposed however that the Phlegræi Campi constitute the whole volcanic region west of Naples, which extends on the other side of the hills of Baiæ and south-west to the Monte di Procida, and also beyond the narrow channel called

Bocche di Procida, including the island of that name and the neighbouring island of Ischia. [Ischia.] Breislak, in his 'Topografia Fisica della Campania,' gives a good description of this volcanic tract, with a map of it. See also G. Poulett Scrope, 'On the Volcanic District of Naples,' in vol. ii. of the second series of the 'Geological Transactions.'

With the exception of the hill of Solfatara, about 300 feet in height, which emits almost continually a sulphureous steam through several fissures, the other craters of this region have been long extinct.

Poetical descriptions of the volcanic phenomena exhibited by the Phlegræi Campi have been given by Virgil, Petronius Arbiter, and other Latin poets. Diodorus Siculus (iv. 21) says that this region, in which Hercules defeated the giants, was called 'Phlegræus Campus, from a hill which once threw up flames in the same manner as Ætna, retaining still the traces of former eruptions.' This hill was probably that now called Solfatara, though Diodorus adds, that 'in his time it was called Vesuvius;' but this must be an error either of the author or of the copyist, as Vesuvius, in the time of Diodorus, had not begun to vomit flames. Besides this, Diodorus characterises the region, which he describes as being near the shore of Cumæ, which description could not apply to Vesuvius. Strabo (p. 245. Casaub.) says that the Cumæa, as some suppose, was called Phlegra from the circumstance of its being full of sulphur, and fire, and hot springs.

PHLEUM, a genus of grasses, contains, among many unimportant species, one of considerable agricultural value. This, the *P. pratense*, or meadow cat's-tail grass, is a general inhabitant of the most fertile pastures, and is regarded as a sign of rich soil. It bears its flowers in a long cylindrical soft head, and is extremely like the meadow foxtail [Alopecurus] in appearance; from which it differs in having unequal glumes, and two paleæ instead of one. This plant is very productive, especially in the early spring, and is a very general component of hay. Nevertheless, according to Mr. Low, it is not a peculiarly good hay-grass, from the wiryness of its stem and the shortness of its aftermath. It is of the greatest use when the object is to procure a sward of permanent herbage.

PHLŒOMYS, Mr. Waterhouse's name for a subgenus of *Muridæ*, which is in the habit of feeding chiefly on the bark of trees, according to Mr. Cuming, after whom the typical species (*Mus* (*Phlœomys*) *Cumingi*) is named.

Locality.—The Island of Luzon. (See further, *Zool. Proc.*, 1839.)

PHLOGISTICATED AIR. [Azote.]

PHLOGISTON, an hypothetical substance, by supposing the existence of which Stahl [Stahl] explained the phenomena of combustion. He imagined that by combination with phlogiston a body was rendered combustible, and that its disengagement occasioned combustion, and after its evolution there remained either an acid or an earth: thus sulphur was by this theory supposed to be composed of phlogiston and sulphuric acid; and lead, of the calx of lead and phlogiston, &c.

At this period however oxygen had not been discovered, and although Jean Rey had shown that metals by burning increased in weight, and Hooke and Mayow had attributed combustion to the presence of the air in which it occurs, yet the doctrine proposed by Stahl maintained its ground for about half a century. Soon after the discovery of oxygen gas by Dr. Priestley, the experiments which others had made on the calcination of the metals were repeated with great accuracy by Lavoisier; the consequence was, that the phlogistic theory gave way to the antiphlogistic: for the combustion, which had been attributed to the extrication of phlogiston, was known in all common cases to be derived from the absorption of oxygen, and this explained the increase of weight which bodies acquired by combustion, whereas on the phlogistic theory they ought to have suffered a diminution by the process.

PHLORIZIN, a peculiar vegetable matter which exists in the bark of the trunk and roots of the apple, pear, cherry, and plum trees. According to Stass, it is most readily obtained, and in large quantity, by treating either the fresh or dried roots of the apple tree with weak alcohol at the temperature of about 150° Fahr. When the digestion has been continued for some hours, the clear solution is to be poured off, and the alcohol distilled; the residual liquor on cooling deposits phlorizin, which is to be rendered colourless by animal charcoal.

Phlorizin, when deposited from a saturated solution, has the form of silky tufts; but when obtained by the slow cooling of a dilute solution, it is in long flat brilliant needles. The taste of phlorizin is rather bitter, followed with slight sweetness; it is scarcely soluble in cold water, but boiling water dissolves it in large quantity; alcohol and pyroxylic spirit also readily take it up, and at all temperatures; æther, even when boiling, dissolves only traces of it, though, when mixed with alcohol, it dissolves it very well; it has no action on vegetable colours.

Phlorizin contains no azote, but, according to Stass, is composed nearly of—

Hydrogen . .	5·4	
Carbon . . .	58·6	
Oxygen . . .	36·0	
		100

Phlorizin is by various processes, described by M. Stass, converted into *phlorizein*, *phloretin*, and *phloretic acid:* for an account of these, we refer to his memoir contained in the 69th vol. of 'Annales de Chimie et de Physique.'

PHOCA. [Seals.]

PHOCÆA. [Ionia; Marseille.]

PHOCÆ'NA, Cuvier's name for the *Porpesses*, *Marsouins* of the French. [Whales.]

PHOCAS, a native of Asia Minor, of an obscure family, entered the army under the reign of the emperor Mauritius, and attained the rank of a centurion. He happened to be with his company on the banks of the Danube when one of those mutinies so frequent in the history of the Eastern empire broke out among the troops on that station, and having probably made himself conspicuous among the disaffected, he was tumultuously proclaimed leader of the insurgents, and he marched with them to Constanstinople. At the approach of the rebels an insurrection broke out in the capital, and the emperor and his family were obliged to escape in a boat to Calchedon. Phocas was proclaimed emperor and crowned by the patriarch, A.D. 602. Mauritius, being taken, was put to death, together with his five sons, and some time after the rest of his family shared the same fate. Phocas sent ambassadors to Khosru II. to announce his accession to the throne, but the Persian monarch having learned the circumstances, took up arms to avenge the cause of Mauritius, and carried on a destructive war in the Asiatic provinces. Phocas found more favour with Rome. Gregory I. wrote him some complimentary letters in which he extols the condition of the Italian subjects of the empire as being free men in comparison with those who were subject to the Longobard and other kings, who treated them as little better than slaves. These letters of Gregory to Phocas and his wife Leontia have been much censured, but we ought to consider that the Roman pontiffs, being at a distance from the Eastern capital, were not competent judges of the frequent insurrections and changes of dynasty which occurred there, while, exposed as they and their flocks were to eminent danger from the Longobards, it was their interest to propitiate the Byzantine ruler for the time being, without investigating too closely his title to the throne.

Phocas remained on good terms with Boniface III. and Boniface IV., the successors of Gregory. He is said by Anastasius, the Papal chronicler, to have acknowledged Boniface III. as the head of all the Christian churches; but that which is better authenticated is his act of donation of the Pantheon at Rome to Boniface IV., to be transformed into a Christian church, A.D. 607.

In the mean time insurrections broke out in several parts of the Eastern empire, which the suspicions and cruelties of Phocas only served to exasperate. Heraclius, exarch of Africa, sent two expeditions, one by sea and the other by land, under his son Heraclius and his nephew Nicetas, who joining before Constantinople, took possession of the city, after some resistance. Phocas was taken and put to a cruel death by order of the younger Heraclius, who succeeded him in the empire, A.D. 610.

(Cedrenus (Xylandri), p. 331, &c.; Gibbon.)

PHOCENIC ACID and **PHOCENIN**. This last is a peculiar fatty matter contained in the oil of the porpoise, combined with olein and a very small quantity of phocenic acid. To procure it, nine parts of the oil are to be treated with ten parts of hot alcohol of sp. gr. 0·797: the liquor, when it has become cold and clear, is to be submitted to distillation, by which an acid of an oleaginous appearance is obtained: if the acid is separated by carbonate of magnesia, and the remaining oil treated with cold weak alcohol, the phocenin is dissolved by it, and it has the following properties:—at 65° its sp. gr. is 0·954; it exhales a weak peculiar odour, somewhat resembling that of æther and phocenic, acid. It is insoluble in water, but very soluble in boiling alcohol.

When 100 parts of phocenin are treated with potash, they are converted into 59 parts of hydrated oleic acid, 15 of glycerin, and 32·82 of dry phocenic acid.

Phocenic Acid is colourless, liquid at usual temperatures, and in appearance resembles a volatile oil; its sp. gr. is about 0·932. It has a very strong smell, and its taste is sour and penetrating. It remains liquid below 32°, and boils at about 212°. It may be distilled in vacuo without alteration; but when distilled in a retort containing air, it is considerably altered, unless distilled with water, and then it rises with it, and it is condensed in a pure state in the receiver. It is nearly as combustible as volatile oils.

According to Chevreul, it is composed of—

Hydrogen . .	8·25
Carbon . . .	65·
Oxygen . . .	26·75
	100

PHOCIAN WAR. [PHILIP (of Macedonia); PHOCIS.]

PHO'CIDÆ. [SEALS.]

PHO'CION (Φωκίων), an Athenian general and statesman, was a contemporary of Demosthenes. His first appearance in history is at the battle of Naxos, B.C. 376, when Demosthenes was seven years old, being himself twenty-seven. He survived Demosthenes four years, and, according to Mr. Thirlwall, is the representative of that party in Athens to which Demosthenes was the constant antagonist.

Plutarch relates that Phocion was the son of a turner, but he disbelieves the story on account of the goodness of his education and the liberal turn of his mind. Whatever was his rank, Phocion found admittance into the school of Plato, and afterwards studied under Xenocrates, whose lessons had perhaps greater influence on his character than even those of Plato; at least it is not difficult to trace a resemblance between Phocion and Xenocrates, while it would be hard to acknowledge any between Phocion and Plato. To a stern and forbidding aspect, a stoical demeanour, and habits of rigid simplicity, Phocion united a kind and generous heart. These qualities secured for him so great a measure of popularity that he was forty-four times elected general, and that in an age when public offices were generally obtained by bribery. He was also heard with so much attention in public, that even Demosthenes dreaded the effect of his terse and pithy harangues.

Plutarch records many of his sayings. There is much wit and point in most of them, indeed they go quite beyond the style of antique jokes, usually so dull to modern ears, and there is much political wisdom in them; but still they have an air of intended wit and a striving after effect which make them look different from the strong and genuine thoughts of an earnest and true-hearted patriot. But after all, when biographer and subject each lived in an age more distinguished for smartness than solidity, we need not hold these speeches inconsistent with that high character for wisdom which Phocion bears.

The public incidents recorded of Phocion's life are, as is natural for the head of the peace party, not numerous. He commanded many times and often successfully, but he seems to have acted the part of an ambassador better than of a general. His death (B.C. 317) took place under circumstances much like those which accompanied that of Socrates. During the confusion which ensued after the death of Alexander, a revolution occurred at Athens, and the democratic party, drunk with success, condemned their chief opponents to death. Among these was Phocion: he died with the greatest composure, and left an injunction to his son, to preserve no remembrance of the wrongs which Athens had done to his father. As in the case of Socrates, the people soon saw their error; repentance however does not usually atone for political crimes, and the parallel between Phocion and Socrates holds good with regard to the evil times which followed their respective executions, showing public ingratitude to be the parent as well as the child of civil corruption. (Plutarch's *Life of Phocion;* Thirlwall's *Hist. of Greece.*)

PHOCIS (Φωκίς) was bounded on the south by the Corinthian Gulf, on the west by Doris and the Locri Ozolæ, on the north by the Locri Epicnemidii and Opuntii, and on the east by Bœotia. The territory of Phocis originally extended to the Eubœan channel, but was in later times entirely separated from the sea by Locris. Strabo says (ix., p. 416) that Phocis was divided into two parts by the range of Parnassos, which extends in a south-easterly direction through Phocis till it joins Mount Helicon on the borders of Bœotia. Parnassos and the mountains which separate Phocis from Locris form the upper valley of the river Cephissus, on the banks of which there is some fertile country, though in many parts the mountains approach very near both banks of the river. The southern part of Phocis is almost entirely covered with the mountains which branch off to the south from the huge mass of Parnassos, though there are a few fertile plains between these mountains, of which the largest is the celebrated Crissæan plain.

We know very little respecting the early inhabitants of Phocis. According to Pausanias (ii., 4, § 3; x., 1, § 1) the people derived their name from a king Phocus; and that the name is of considerable antiquity is evident from the Phocians being mentioned by Homer (*Il.*, ii. 517). Previous to the Persian invasion they appear to have been frequently engaged in hostilities with the Thessalians, and to have been successful in maintaining their independence. (Herod., viii. 27, 28.) Xerxes, at the instigation of the Thessalians, ravaged Phocis with fire and sword, and destroyed many of their cities. (Herod., viii. 32.)

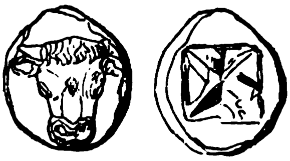
The Phocians had no political importance till after the battle of Leuctra: but shortly after that event, circumstances occurred which occasioned the celebrated Phocian or Sacred War, in which all the great states of Greece were more or less concerned. The immediate occasion of this war is said by Diodorus (xvi. 23) to have been an act of sacrilege committed by the Phocians in cultivating a part of the Crissæan plain, which had been doomed by a decree of the Amphictyons, in B.C. 585, to lie waste for ever. But whatever may have been the immediate, the real occasion of the war was the animosity between Thebes and Phocis, which had long prevailed under a show of peace. The Thebans used their influence in the Amphictyonic council to induce the Amphictyons to sentence the Phocians to pay a heavy fine to the god for the violation of the sacred land; and on their refusing to pay this fine, the council passed a decree that if the fine were not paid, the Phocians should forfeit their territory to the gods, which decree was in all probability intended to reduce the Phocians to the condition of the Helots in Laconica, subject to the jurisdiction of the temple of Delphi. In these alarming circumstances the Phocians were induced by Philomelus, who appears to have held some high office in the Phocian state, and was a man of great talent and energy, to make the bold attempt at seizing the city and temple of Delphi. This attempt was successful, and the Phocians obtained in the treasures deposited in the temple ample means for carrying on the war. This war, which lasted for ten years, was carried on with various success on both sides. The Thebans and almost all the northern states of Greece were opposed to the Phocians; and though the Athenians and Spartans were willing, in consequence of their fear of the power of Thebes, to afford assistance to the Phocians, the former were too much weakened by the Peloponnesian war, and the latter by the Theban victories and the formation of Messenia as an independent state, to render any effectual aid. But what the Phocians wanted in allies was compensated by mercenary troops; and it is difficult to say how long the struggle might have lasted, had not the Amphictyons called in the assistance of Philip of Macedon, who took possession of Delphi, and put an end to the war, B.C. 346. The Phocians were severely punished for their sacrilege; all their cities, with the exception of Abæ, were razed to the ground, and their inhabitants dispersed in villages not containing more than fifty inhabitants. Their two votes in the Amphictyonic council were taken away and given to Philip. (Paus., x., 3, § 1; Diod., xvi. 59; Æschin., *De Fals. Legat.*, p. 45.) Many of the towns however appear to have been rebuilt soon afterwards. [PHILIP, p. 74.]

The principal towns of Phocis were Delphi [DELPHI] and Elatea; the latter of which was situated on a small hill above the plain watered by the Cephissus. It was taken and burnt by the army of Xerxes (Herod., viii. 33), but was rebuilt soon afterwards, and became from its position the most important town in Phocis. It commanded the chief road which led from the north of Greece to Bœotia and Attica (Strab., ix., p. 424), and hence we read in Demosthenes (*De Corona*, p. 284) that the greatest alarm prevailed at Athens when intelligence was brought that Elatea was seized by Philip. The ruins are at the modern Elephta.

On the sea coast the first town we come to after leaving the Locri Ozolæ is Cirrha, situated at the head of the Crissæan Gulf (*Bay of Salona*) and at the mouth of the Pleistus. Cirrha was the port of Delphi, from which it was distant 60 stadia according to Pausanias (x. 37, § 4), and 80 according to Strabo (ix., p. 418). This town is frequently confounded with Crissa, which is mentioned as a separate place by Strabo, and said to have been situated between Delphi and Cirrha. The Crissæans were charged by the Delphians with undue exactions from the strangers who came to consult the Delphian oracle. The Amphictyons declared war against them, which, after lasting for ten years, ended in the destruction of Crissa, B.C. 585, the land of which was dedicated to the god. (Paus., x. 37, § 4.)

The next town to Cirrha on the coast was Anticyra, celebrated for its preparation of hellebore, which grew in the mountains above the town. (Strab., ix., p. 418; Paus., x. 36, § 3.) Next to Anticyra was Medeon, destroyed with the other Phocian towns after the termination of the Sacred War and never restored (Paus., x. 36, § 3); and after it the small town of Marathus (Strab., ix., p. 423), beyond which was the Pharygian promontory with a station for ships. The most easterly town in Phocis on the coast was Mychus. (Strabo, ix., p. 423.)

There are few towns of any importance inland, with the exception of Delphi and Elatea. North-east of Delphi was Lycorea, a place of great antiquity. It is said in the Parian Marble to have been the residence of Deucalion, and Strabo (ix. 418) speaks of it as more antient than Delphi. (Compare Paus., x. 32, § 6.) Above Lycorea was Tithorea or Neon, at the distance of 80 stadia from Delphi. (Paus., x. 32, § 6.) Its ruins are near the modern village of Velitza. Pausanias (x. 32, § 11) says that the oil of Tithorea was admirable for the composition of perfumed ointments. West of Tithorea, and at the foot of Parnassos, was the antient city of Lilæa, which is mentioned by Homer (*Il.*, ii. 523) as near the sources of the Cephissus. It was distant from Delphi 180 stadia across the Parnassos. (Paus., x. 33, § 1.) On the borders of Bœotia was the town of Ambysus or Ambyssus (Paus., x. 36, § 2; Strabo, ix. 423), which is not unfrequently mentioned in history. In the Macedonian war it was taken by Flamininus. (Liv., xxxii. 18.) Its ruins were discovered by Chandler near the modern village of Dystomo.



Coin of Phocis.

British Museum. Actual size.

PHOCY'LIDES, of Miletus, was a philosopher and poet, and flourished about B.C. 535. An admonitory poem (ποίημα νουθετικὸν) is attributed to this Phocylides; but it is uncertain whether it was written by him or by another of the same name in later times. The reader is referred, for a discussion of this question, to the first volume of the 'Bibliotheca Græca' of Fabricius.

There are several editions of Phocylides, both separate and along with Theognis and others. A convenient and correct edition of these Greek gnomic or sententious poets is that printed by Tauchnitz, Leipzig, 1819, which includes seven fragments of Phocylides, besides the above-mentioned poem.

PHŒNI'CE, PHŒNICIANS (Φοινίκη, Φοίνικες). Phœnice* proper, even in its most flourishing state, was a very small country. It extended along the eastern coast of the Mediterranean, from the town of Aradus and the river Eleutherus, on the north, to Mount Carmel, or Dora, on the south. (Ptolem., v. 15; Plin., *Hist. Nat.*, v. 13, 17; Joseph., *Apion*, ii. 9.) It was bounded on the east by the mountains Libanus and Antilibanus, from which numerous streams descended, which rendered the land exceedingly fertile. (Ammianus Marcell., xiv. 8.) The physical character of this country is more particularly described under SYRIA.

This short line of coast was covered with numerous towns, which were more or less celebrated for their arts and manufactures. The most southerly town of importance was Acco, called by the Greeks Acca, and subsequently Ptolemais (*St. Jean d'Acre*), which the Israelites did not conquer, though it was included in the division of the Holy Land made by Joshua. (*Judges*, i. 31.) In the time of Augustus (Strabo, xvi., p. 758) it was a large city; and under Claudius it became a Roman colony. (Plin., *Hist. Nat.*, v. 17.) The subsequent history and present state of this city are given under ACRE.

North of Acco was TYRE, the principal of the Phœnician cities, and north of Tyre, SIDON. Between Tyre and Sidon was Sarepta (*Sarphand*), which is mentioned in the history of Elijah (1 *Kings*, xvi. 9) under the name of Zarephath. (Compare *Obadiah*, v. 20; *Luke*, iv. 26; Joseph., *Antiqu.*, viii. 13, § 2.) About eight miles and a half north of Sidon was Berytus, a very antient town with a harbour. (Ptolem., v. 15; Strabo, xvi., p. 755; Joseph., *Bell. Jud.*, vii. 3, § 1; Ammian. Marcell., xiv. 8; Mela, i. 12.) It is supposed by some writers to be the same place as Berothai, which was taken by David. (2 *Sam.*, viii. 8.) Berytus was destroyed by Diodotus Tryphon (B.C. 140), but was rebuilt by Agrippa, who stationed there two legions. (Strabo, xvi., p. 756.) It also became a Roman colony under the name of Felix Julia. (Plin., *Hist. Nat.*, v. 17.) The modern town of Bairuth or Beirut is still a place of some importance. [BEIRUT.]

Twenty-four miles north of Berytus was Byblos, situated on rising ground, not far from the sea. It was celebrated for the worship of Adonis. (Strabo, xvi., p. 755; Plin., *Hist. Nat.*, v. 17; Mela, i. 12; Ptolem., v. 15.) Winer supposes (*Biblisches Realwörterbuch*, art. *Byblos*) that the town Gebal mentioned in the Old Testament (*Ezek.*, xxvii. 9; compare *Josh.*, xiii. 5) is the same place as Byblos. [BYBLUS.]

North of Byblos was Botrus; and beyond it Tripolis, which originally consisted of three distinct towns, founded respectively by Sidon, Tyre, and Aradus, and was used by the inhabitants of the different cities of Phœnice as a common place of meeting for deliberating on subjects of common importance. (Strabo, xvi. 754; Plin., v. 17; Diod. Sic., xvi. 41; Mela, i. 12.) North of Tripolis was Orthosias (Plin., *Hist. Nat.*, v. 17; Strabo, xvi., p. 753; 1 *Macc.*, xv. 37), and still farther north Aradus, a colony of Sidon, and the most important town in Phœnice after Tyre and Sidon, situated in an island of the same name, which is called Arvad in the Old Testament. (*Ez.*, xxvii. 8; *Gen.*, x. 18.) This island was at the mouth of the Eleutherus, and 20 stadia from the mainland. It was only seven stadia in circumference, but was crowded with houses. (Strabo, xvi. 753; Plin., v. 17; Mela, ii. 7.) Opposite to it on the mainland was the town of Antaradus.

The Phœnicians were a branch of the great Semitic or Aramæan family of nations, and originally dwelt either on the Red Sea or the Persian Gulf. (Herod., i. 2; vii. 89; Strabo, i., p. 42.) It is uncertain at what time they emigrated to the coast of the Mediterranean; but it must have been at a very early period, since Sidon was a great city in the time of Joshua (*Josh.*, xix. 28). The Phœnicians far surpassed all the other nations of antiquity in commercial enterprise. Their greatness as a commercial people was chiefly owing to their peculiar natural advantages. Their situation at the extremity of the Mediterranean enabled them to supply the western nations with the different commodities of the East, which were brought to Tyre by caravans from Arabia and Babylon; while their own country produced many of the most valuable articles of commerce in antient times. Off the coast the purple fish was caught which produced the most celebrated dye known to the antients, and the sand on the sea-shore was well adapted for the manufacture of glass. (Strabo, xi. 758; Plin., xxxvi. 65.) Mount Libanus supplied them with abundance of timber for ship-building, and the useful metals were obtained in the iron and copper mines near Sarepta. In the west they in all probability visited Britain [CASSITERIDES]; and on the north coast of Africa, in Spain, Sicily, and Malta, they planted numerous colonies, which they supplied with the produce of the East. Their settlements in Sicily and Africa became powerful states, and long opposed a formidable barrier to the Roman arms. [CARTHAGE.] By their alliance with the Jewish state in the time of Solomon, they were enabled to sail to Ophir in the south of Arabia, where they obtained the produce of India. (2 *Chron.*, viii. 17, 18; 1 *Kings*, ix. 27, 28.) Herodotus says that they circumnavigated Africa, but there appears considerable reason for doubting the truth of this account. [AFRICA, vol. i., p. 172.] It has been even maintained by some writers that they sailed to America. (Diod. Sic., v. 19.)

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* Modern writers usually call the country Phœnicia, but this form is not once found in the antient writers, with the exception of a doubtful passage in Cicero. (*De Fin.*, iv. 20).

The Greeks attributed the invention of letters to the Phœnicians, and there can be little doubt that the Greek alphabet was derived from the Phœnician. They are also said to have invented arithmetic and many of the sciences; but the traditions on these subjects are too vague to enable us to come to any safe conclusion. There can be no doubt however that they attained to great perfection in the arts in very early times. The Tyrians supplied Solomon with all kinds of artificers to assist in the building of the temple at Jerusalem (2 *Chron.*, ii.), and the workmanship of the artists of Sidon was celebrated in the Greek towns of Asia Minor as early as the time of Homer. (*Il.*, xxii. 741; *Od.*, xv. 118.)

The Phœnician cities appear to have been originally independent of one another, and to have possessed for the most part a monarchical form of government. The oldest of these cities was Sidon (*Gen.*, x. 15), but Tyre became in later times the most important, and probably exercised some degree of authority over the other states. After the conquest of Samaria and Judæa, the Phœnicians became subject successively to the Assyrian, Babylonian, and Persian monarchies. In the wars between the Greeks and Persians, the Phœnicians formed the chief and most efficient part of the Persian navy. They afterwards formed part of the dominions of the Seleucidæ, and were eventually included in the Roman province of Syria.

The language of the Phœnicians and of the different colonies which they planted closely resembled the Hebrew and Aramaic. Even if we had no remains of the language we could have little doubt that such was the case; but Gesenius has satisfactorily shown, from numerous coins and inscriptions, the intimate connection between the Phœnician and the other languages of the Semitic nations. The letters of the Phœnician alphabet closely resemble those of the Samaritan. In addition to which it may be remarked, though no further proof is wanted, that Jerome represents (*Comment. ad Is.* vii. 19) the Phœnician language as allied to the Hebrew, and he says the same of the Punic, which however, he observes, was more remote from the mother tongue. (*Comment. ad Gen.* xxxvi. 24.) Augustin also makes the same remark respecting the Punic, which was spoken at Hippo in his time. For further information upon this subject the reader is referred to Gesenius's 'Paläographische Studien über Phönizische und Punische Schrift,' 4to., Leip., 1835, and 'Scripturæ Linguæque Phœniciæque Monumenta,' &c., 4to., Leip., 1837. Among the works written in the Phœnician language, the most celebrated is the history of the Phœnicians and Egyptians, in nine books, by Sanchoniathon, of which a Greek translation was made by Philo Byblius in the first half of the second century of the Christian æra. [SANCHONIATHON.]

PHŒNI'CIA. [PHŒNICE.]

PHŒNICIRCUS. [PIPRINÆ.]

PHŒNICOPHAINÆ. [PHŒNICOPHAUS.]

PHŒNICOPHA'US, M. Vieillot's name for a genus of birds founded on the *Malkohas*, or *Malcohas*. Levaillant appears to have been the first who proposed a separation of the form from the *Cuckoos*, and Mr. Swainson, who in his 'Synopsis' places it among the *Crotophaginæ*, or *Horn-Bill Cuckoos*, observes that the passage from the *Toucans* to the *Cuckoos* seems to be marked by such genera as *Phœnicophaus* or *Saurothera*, where the bill, as in the first, is either much larger and thicker than in the generality of *Cuckoos*, and is thus assimilated in shape to that of the *Toucan*, or as in *Saurothera*, where the edges become dentated.

The *Generic Character*, as restricted by Mr. Swainson, will be found in the article INDICATORINÆ.

Example, *Phœnicophaus Pyrrhocephalus*.

This appears to be the *Cuculus Pyrrocephalus* of Forster and the *Phœnicophaus leucogaster*, Desm.

In July, 1839, Mr. Fraser read to a meeting of the Zoological Society of London his description of a bird of this genus, *Phœnicophaus Cumingi*, belonging to Mr. Swainson's subdivision *Dasylophus*, forwarded by Hugh Cuming, Esq., corresponding member from Luzon. Mr. Fraser pointed out that it might at once be distinguished from all the known members of the family by the singular structure of the feathers of its crest and throat; the shafts of these feathers are expanded at their extremities into laminæ, which may be compared to the shavings of whalebone; and in this respect they resemble the crest of the Toucan, to which Mr. Gould, in his monograph, applies the name *Pteroglossus ulocomus*, which is the *Pt. Beauharnesii* of Wagler, but are not curled as in that species. The feathers above the nostrils, of the crest and chin, and along the middle of the throat, are grey at the base, have a decided white spot towards the middle, and are terminated by a broad expansion of the shaft, which is of a glossy black colour, with blue or greenish reflections. The external edge of this expanded portion of the shaft is minutely pectinated. The occiput and sides of the head are grey, passing into dirty white on the cheeks and sides of the throat; the hinder part and sides of the neck and the breast are of a deep chestnut colour; the back, wings, and tail are of a deep shining green colour; all the tail-feathers are broadly tipped with white; the vent, thighs, and under tail-coverts are dusky brown tinged with green; the bill is horn-colour; the feet olive. According to that indefatigable collector Mr. Cuming, this beautiful and interesting bird is named *Ansic En Bicol* in the Albay tongue. The eyes were red, and the pupil large and black. The length from beak to tail was eight inches and a half, and the measurement round the body five inches. Total length sixteen inches. (Fraser.) (*Zool. Proc.*, 1839.) In the same volume another species, from Malaya, *Phœnicophaus viridirostris* is described by Mr. Eyton—native name, see *Lahia*. The synonyms given are *Psittacula Malaccensis*, Kuhl—native name, *Tana; Bucco trimaculata*, Gray—native name, *Tanda;* and *Bucco versicolor*, Raff.—native name, *Tahoor*. *Phœnicophai tricolor*, Steph.—native name, *Kado besar; Chlorocephalus* (*Cuculus chlorocephalus*, Raffles—native name, see *Luhia*); *Crawfurdii*, Gray—native name, *Kada Kachie;* and *Javanicus*, Horsf.—native name, *Kada Apie*, are also referred to by Mr. Eyton as synonyms of *Anthreptes modesta* from Malaya—native name, *Chichap Nio*.

In Mr. G. R. Gray's arrangement the *Phœnicophainæ* consist of the genera *Phœnicophaus*, Vieill.; *Carpococcyx*, G. R. Gray; *Rhinortha*, Vig.; and *Taccocua*, Less.; and the six subfamilies of the *Cuculidæ* are *Indicatorinæ*, *Saurotherinæ*, *Centropinæ*, *Phœnicophainæ*, *Coccyzinæ*, and *Cuculinæ*.

PHŒNICOPTERI'NÆ, Mr. Swainson's name for his first subfamily of the *Anatidæ*, consisting of the genus *Phœnicopterus* only. The same position is given to the *Phœnicopterinæ* by Mr. G. R. Gray.

PHŒNICO'PTERUS. [FLAMINGO.]

PHŒNICO'RNIS, Mr. Swainson's name for a genus of *Ceblepyrinæ*, or *Caterpillar-Catchers*. [SHRIKES.]

PHŒNICU'RA. Mr. Swainson's name for the *Redstarts*. [SYLVIADÆ.]

PHŒNISO'MA, Mr. Swainson's name for a genus of *Fringillidæ;* and placed by him in the subfamily *Tanagrinæ*. [FRINGILLIDÆ; TANAGRINÆ.]

PHŒNIX (Φοῖνιξ), one of the most renowned of the fabulous monsters of antiquity, defined by the Arabians to be *maloúmo 'l-ismo, majnoúlo 'l-jismo* '(a creature) whose name is known, its body unknown.' (Richardson's *Arabic and Persian Dict.*) It is supposed by some persons to be mentioned in the Bible, *Job*, xxix. 18, and *Psalms*, xcii. 12. In the former passage כחול is translated in our version 'as the sand,' but by Bede, 'Sicut *Phœnix;*' in the other, כַּתָּמָר, which is rendered in our version 'like the palm tree,' is explained to mean the phœnix by Tertullian (*De Resurrect. Carnis*, sec. 13, p. 387). Omitting these two passages, which are rightly translated in our version, and therefore have no reference to the phœnix, the earliest author who mentions it is Hesiod (ap. Plut., *De Defectu Orac.*, cap. 11, ed. Tauchn.; and ap. Plin., *Hist. Nat.*, lib. vii., cap. 49), who merely says that it lives nine times as long as a crow. The first detailed description and history that we meet with is in Herodotus, whose words on that account deserve to be quoted at length. 'There is also,' says he, in his account of Egypt (lib. ii., cap. 73), 'another sacred bird, the name of which is the phœnix; I have not myself seen it except in a picture, for it seldom visits them, only (as the people of Heliopolis say) every five hundred years. And they say that he only comes when his sire dies. And he is, if he is like his picture, of size and shape as follows: part of his plumage is gold-coloured, and part crimson; and he is for the most part very like to the eagle in outline and bulk. And this bird, they say, devises as follows, but they say what is to me beyond belief: that setting out from Arabia, he brings his sire to the temple of the sun; that he covers him with myrrh, and buries him in the temple of the sun: and that he conveys him thus: first he forms an egg of myrrh as large as he is able to bear, and afterwards tries whether he can carry it; and when he has made the trial, upon this he hollows out the egg, and puts his sire into it, and covers with other myrrh that part of the egg where he had made the hole and put in his sire; and when his sire lies inside, the weight [of the egg] is the same [as it was before it was hollowed out], and having covered him up, he conveys him to Egypt into the temple of the sun. Such are the things which they say this bird performs.' Such is the story as told in Herodotus, and it is substantially the same as what was afterwards, though with various embellishments, repeated and believed for more than a thousand years. It would be tedious and useless to quote the words of each author who forms a link in the chain: it will be sufficient to mention that, between the times of Herodotus and Tacitus, the fable of the 'Phœnix' is told more or less fully and circumstantially by the following classical writers: Antiphanes (ἐν τοῖς 'Ομοπατρίοις, ap. Athen., *Deipnos*, lib. xiv., sec. 70, p. 655), Chæremon (ap. Tzetz., *Chil.*, v. 395), Lucan (*Phars.*, lib. vi., v. 680), Martial (*Epigr.*, v. 7), Mela (*De Situ Orb.*, lib. iii, cap. 8), Ovid (*Metam.*, lib. xv., v. 391, sq.; *Amor.*, lib. ii., el. 6, v. 54), Pliny (*Hist. Nat.*, lib. x., cap. 2; lib. xi, cap. 44; lib. xiii., cap. 9), Seneca (*Epist.*, 42, sec. 1), and Statius (*Silv.*, lib. ii., 4, 36; lib. iii., 2, 114). The passage in which Tacitus notices the Phœnix is very remarkable, and deserves to be quoted at length as being the most authentic account of it that has been preserved and also as showing that so cautious and accurate a man as he is always considered to be entertained no kind of doubt as to its real existence and its periodical appearance in Egypt. 'In the consulship of Paulus Fabius and Lucius Vitellius,' says he (in Murphy's translation, *Annal.*, lib. vi., cap. 28) A.U.C. 787, A.D. 34, 'the miraculous bird, known to the world by the name of the phœnix, after disappearing for a series of ages, revisited Egypt. A phenomenon so very extraordinary could not fail to produce abundance of curious speculation. The learning of Egypt was displayed, and Greece exhausted her ingenuity. The facts, about which there seems to be a concurrence of opinions, with other circumstances, in their nature doubtful, yet worthy of notice, will not be unwelcome to the reader. That the phœnix is sacred to the sun, and differs from the rest of the feathered species in the form of its head and the tincture of its plumage, are points settled by the naturalists. Of its longevity the accounts are various. The common persuasion is that it lives five hundred years' [Herodotus, Ovid, Seneca, and Mela, *locis cit.*; Philostratus (in *Vitâ Apollon. Tyan.*, iii., 49, ed. Olear., p. 134 and 135), Ælian (*Hist. Animal.*, lib. vi., cap. 58), Aurelius Victor (*De Cæsar.*, cap. 4, sec. 12; *Epit.*, cap. 4, sec. 10), Horapollo (in *Hieroglyph.*, No. 34, p. 41); St. Clement of Rome (*Epist. ad Corinth.*, cap. xxv., p. 98, ed. Jacobson), St. Cyril of Alexandria (*Catech.* xviii. 8)]; 'though by some writers the date is extended to one thousand four hundred and sixty-one.* The several æras when the phœnix has been seen are fixed by tradition. The first, we are told, was in the reign of Sesostris; the second, in that of Amasis; and in the period when Ptolemy, the third of the Macedonian race, was seated on the throne of Egypt, another phœnix directed its flight towards Heliopolis, attended by a group of various birds, all attracted by the novelty, and gazing with wonder at so beautiful an appearance. For the truth of this account we do not presume to answer. The facts lie too remote; and covered, as they are, with the mists of antiquity, all further argument is suspended. From the reign of Ptolemy to Tiberius, the intermediate space is not quite two hundred and fifty years. From that circumstance it has been inferred by many that the last phœnix was neither of the genuine kind nor came from the woods of Arabia. The instinctive qualities of the species were not observed to direct its motions. It is the genius, we are told, of the true phœnix, when its course of years is finished, and the approach of death is felt, to build a nest in its native clime, and there deposit the principles of life, from which a new progeny arises. The first care of the young bird, as soon as fledged, and able to trust to its wings, is to perform the obsequies of his father But this duty is not undertaken rashly. He collects a quantity of myrrh, and to try his strength, makes frequent excursions with a load on his back. When he has made his experiment through a long tract of air, and gains sufficient confidence in his own vigour, he takes up the body of his father, and flies with it to the altar of the sun, where he leaves it to be consumed in flames of fragrance. Such, adds Tacitus, 'is the account of this extraordinary bird. It has, no doubt, a mixture of fable; but that the phœnix, from time to time, appears in Egypt, seems to be a fact sufficiently ascertained.'

After the time of Tacitus the fable of the phœnix is repeated or alluded to by the following classical authors, besides those already referred to:—Achilles Tatius (*De Leuc. et Clit.*, lib. iii., cap. 25, p. 147, ed. Mitscherl.), Aristides (*Orat.*, tom. ii., p. 107, ed. Jebb, et ibi Scholiast.), Artemidorus (*Oneirocrit.*, lib. iv., cap. 49, p. 228, ed. Rigalt), Ausonius (*Eidyll.*, 18, v. 6, p. 535: and *Eidyll.*, 11, v. 16, p. 454, ed. Toll.), Claudian (*Eidyll.*, 1, 'De Phœnice;' in *Prim. Consul. Stilich.*, lib. ii., v. 414, sq.; *Epist.*, i. 'Ad Seren.,' v. 15), Dion Cassius (*Hist. Rom.*, lib. 58, cap. 27), Diogenes Laertius (*De Vit. Philosoph.*, lib. ix., cap. 11, secs., 9 and 79), Lampridius (in *Heliogab.*, cap. 23), Lucian (*Hermot.*, cap. 53: *Navig.*, cap 44; *De Morte Peregr.*, cap. 27), Oppian (*De Aucupio*, i. 28, ed. Schneid., p. 182), Photius (*Biblioth.*, cod. 126, p 305), and Solinus (*Polyhist.*, xxxiii. 11). Of these passages perhaps the only one curious enough to be particularly noticed is that in Lampridius, who tells us that Heliogabalus promised his guests a phœnix for supper: he was however obliged to be content with a dish of the tongues of phœnicopters (or flamingos).

But it is not only in heathen authors that this fable is to be found; it is mentioned and believed by the Jewish Rabbinical writers, and by the early fathers of the Christian church. Ezekiel, the Jewish tragic writer [vol. ix., p. 135, col. b], describes the phœnix in his 'Exagoge' (ap Euseb., *Præpar. Evangel.*, lib. ix., cap. 29, p. 446, ed. Colon., 1688); and Kimchi informs us (ap. Bochart, *Hieroz.*, part ii., lib. vi., cap. 5, p. 818) that in the passage of Job quoted above some of the Rabbis read חול, *the Phœnix*, instead of חול, *the sand*. The very words of several of these writers may be seen in Bochart (*loco cit.*); but the only Rabbinical addition to the story worth noticing is preserved by Rabbi Osaia in his 'Berescith Rabba,' cap. 19 (ap. Bochart, *loco cit.*), who says that the reason why the phœnix lives so long, and is in a manner exempt from death, is because it was the only animal that did not eat of the forbidden fruit in Paradise. A somewhat similar bird seems to have been known to the Arabians under the name of *Anka*. Mr. Lane, in the notes to his new translation of the 'Tales of a Thousand and One Nights' (ch. 20, note 22), tells us, on the authority of Kaswini, that the anka is the greatest of birds; that it carries off the elephant as the kite carries off the mouse: that, in consequence of its carrying off a bride, God, at the prayer of a prophet named Handhalah, banished it to an island in the circumambient ocean, unvisited by men, under the equinoctial line; that it lives one thousand and seven hundred years; and that when the young anka has grown up, if it be a female, the old female bird burns herself; and if a male, the old male bird does so.

Many of the early fathers believed the story so firmly that they did not hesitate to bring it forward as a proof of the resurrection; and that, not as an *argumentum ad hominem*, when disputing with heathens, but seriously, and in writings addressed to converts to Christianity. St. Clement is the first who uses this argument (*loco cit.*), in which he is followed by St. Cyril and Tertullian (*locis cit.*), and Epiphanius (*Ancor.*, sec. 84, p. 89). The passage in St. Cyril (which also contains two or three additional embellishments) will serve as a specimen. 'God knew men's unbelief,' says he (in Mr. Church's translation, Oxford, 1838), 'and provided for this purpose a bird called a phœnix. This bird, as Clement writes, and as many more relate, the only one of its race, going to the land of the Egyptians at revolutions of five hundred years, shows forth the resurrection; and this, not in desert places, lest the mystery which comes to pass should remain unknown, but in a notable city, that men might even handle what they disbelieve. For it makes itself a nest of frankincense and myrrh and other spices; and entering into this when its years are fulfilled, it evidently dies and moulders away. Then from the mouldering flesh of the dead a worm springs, and this worm, when grown large, is transformed into a bird; and do not disbelieve this, for thou seest the offspring of bees also fashioned thus out of worms, and from eggs which are most moist thou hast seen the wings and bones and sinews of birds issue. Afterwards this phœnix, becoming fledged and a perfect phœnix, as was the former one, soars up into the air such as it had died, showing forth to men a most evident resurrection from the dead. The phœnix indeed is a wondrous bird, yet is irrational, nor sings psalms to God; it flies abroad through the sky, but it knows not the only-begotten Son of God. Is then a resurrection from the dead given unto this irrational creature, which knows not its maker; and to us, who ascribe glory to God and keep His commandments, shall there no resurrection be granted?' The story is also mentioned at greater or less length by Alcimus Avitus (*De Orig. Animæ*, i. 14, sec. 3), St. Ambrose (*Hexaem.*, lib. v., cap. 23; *In Psalm* cxviii., *Serm.* 19), St. Augustin (*De Nat. et Orig. Animæ*, tom. vii., lib. iv., col. 1203; *Serm.*, 18, tom. x., col. 1308), Epiphanius (*Physiol.*, tom. ii., p. 203), Eusebius (*De Vitâ Constant.*, lib. iv., cap. 72), Isidorus Hispalensis (*Orig.*, lib. xii., cap. 7), Lactantius (*Carm. de Phœnice*), St. Gregory of Nazianzum (*Orat.*, 37, p. 598), and Ruffinus (*in Symb. Exposit.*, p. 548). Origen seems to doubt its truth (*Cont. Cels.*, lib. iv., cap. 98, p. 229), and Photius blames St. Clement for his credulity in mentioning it (*Biblioth.*, cod. 126, p. 305); but these two are (as far as the writer is aware) the only two of the antient authors who do not believe it. This however ought not to lessen the authority of the fathers on other matters, nor should it be made a subject of reproach against them that 'they were not proficients in a branch of knowledge which has been a peculiar study of modern times.' (See Mr. Newman's preface to Mr. Church's *Translation of St. Cyril*, Oxf., 1838.)

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* Manilius (ap. Plin., *Hist. Nat.*, lib. x., cap. 2) says that it lived five hundred and nine years; Solinus, five hundred and forty; Martial, one thousand; Chæremon, seven thousand and six

It would be almost impossible to enumerate all the more modern authors who, during the middle ages, expressed their belief in the existence of the Phœnix, for the list would include almost all the writers on natural history, besides a great number of others. Perhaps the most curious circumstance relating to it is what is told us by Camden (*Britannia*, p. 783, ed. Lond., 1607), viz. that Pope Clement VIII. sent, in 1599, to Lord Tyrone, the chieftain of the Irish rebels, a Phœnix's feather. This was mentioned in his work only eight years after the event took place, but we are not informed how the Pope procured the feather, or what had become of it at the time when Camden wrote.* Patricius Junius (*Patrick Young*), in his note on the passage of St. Clement, published 1633, argues in favour of the existence of the Phœnix, and says, 'Malo cum Clemente, Tertulliano, Origene, &c., errare, quam Maximum' (i.e. Max. Mart. Lib. ad Petrum cont. Severi Dogmata) 'et ejus sequacium opinionem sequi.' Sir Thomas Browne, in his 'Vulgar Errors,' (of which the first edition was published in 1646), thinks it necessary to state at some length his reasons for disbelieving the existence of the Phœnx (book iii., ch. 12); and in 1552 he was attacked for this and other pieces of incredulity by Alexander Ross, in a work entitled 'Arcana Microcosmi;' or, 'The Hid Secrets of Man's Body discovered,' &c. With respect to the Phœnix, the writer is not surprised at its seldom making its appearance, its instinct teaching it to keep out of the way of the tyrant of the creation—man; 'for had Heliogabalus, that Roman glutton, met with him, he had devoured him, though there were no more in the world!' (*Arca. Micr.*, p. 202.) Alexander Ross, who was really a person of some sense and learning, was probably one of the last believers in the Phœnix, which is now given up entirely to the poets; indeed, since the appearance of the 'Rejected Addresses,' almost abandoned even by them.† Of modern writers, besides Bochart and Sir Thomas Browne, the following are best worth consulting:—Henrichsen, 'Commentatio de Phœnicis Fabulâ,' Havn., 1825, 1827, 8vo.; Martini's edition of Lactantii 'Carmen de Phœnice,' 8vo., Lunæb., 1825; Salmasius, 'Exercit. Plin.,' p. 385, seq.; Creuzer, 'Symbolik und Mythologie,' &c., vol. i., p. 438, sq.; Münter, 'Sinnbilder und Kunstvorstellungen der alten Christen,' 4to., Altona, 1825, p. 94, sq.; Métral, 'Le Phénix, ou l'Oiseau du Soleil,' Paris, 1824; from one or other of which works the writer, to avoid the appearance of pedantry and ostentation, freely and willingly confesses that all the above references have been taken, except *three;* and of those *three, two* were furnished him by a friend.

PHŒNIX, a southern constellation of Bayer, which may be best described as close to (but farther from the south pole than) the bright star in Eridanus (Achernar). Its principal stars are as follows:—

Character. (none in Bayer.)	No. in Catalogue of		Magnitude.
	(Piazzi) Lacaille. C.	Astron. Society.	
κ	(68)	30	5
α	(69)	31	2
	(76)	151	5
γ	(94)	161	3
ι	(120)	2813	5
φ	(212)	204	5
χ	(248)	224	5
λ¹	25 C	40	5
μ	41 C	63	5
η	47 C	69	5
β	68 C	112	3½
ζ	71 C	123	5
δ	91 C	167	4
θ	1906 C	2821	5
ε	1938 C	5	4

PHŒNIX, a genus of palms, which has been so named from one of its species, the date-tree, having been called so by the Greeks: this name is thought by some to be derived from Phœnicia, because dates were procured from thence. The genus is common in India and in the north of Africa, and one of the species grows in Arabia, the lower parts of Persia, and along the Euphrates to Syria. The genus is characterised by having flowers diœcious, sessile, in a branched spadix, supported by a simple spathe; calyx urceolate, 3-toothed; corol 3-petalled; stamens 6 or 3; filaments very short, almost wanting; anthers linear; (female) calyx urceolate, 3-toothed; corol 3-petalled, with the petals convolute; pistil with three ovaries, distinct from each other, of which one only ripens; stigmas hooked; drupe one-seeded; seeds marked on one side with a longitudinal furrow; albumen reticulate; embryo in the back of the seed; palms with [illegible]ms of a moderate height and ringed, or marked with the seams of the fallen leaves; fronds or leaves pinnate; pinnæ or leaflets linear, with the spadix bursting among the leaves, surrounded with an almost woody two-edged sheath; flowers yellowish-white; fruit soft, edible, of a reddish yellow colour.

Phœnix dactylifera, or the date-tree, is one of the best known and probably the earliest known of the palms, and though belonging to a family which abounds and flourishes most in tropical regions, itself attains perfection only in comparatively high latitudes. It is no doubt the species to which the name Palma was originally applied, as we may infer from its being common in Syria, Arabia, the lower parts of Persia, as well as Egypt and the north of Africa, whence it has been introduced into the south of Europe, and cultivated in a few places, not only as a curiosity, but on account of its leaves, which are sold twice in the year, in spring for Palm Sunday, and in September for the Jewish Passover; and also, from the name not being applicable to the other species known to the antients, as it is considered that the bunches of dates were likened to the fingers of the hand, as appears from the present specific name, *dactylifera*, from the Greek *dactylus*, a finger. It is the palm-tree of Scripture, and was emblematic of Judæa, as we see in coins with the inscription of *Judæa capta*. It is found in oases in the desert, and round Palmyra, which is supposed to have been named from its presence. This appears indeed to be only a translation of the Oriental name, which is Tadmor, supposed to be a corruption of Tamar (from *tamr*, a date), a city built in the desert by Solomon. The date-tree is therefore a subject of classical as well as of scriptural interest, besides its fruit forming a large portion of the food of a great part of the Arab race, and also a considerable article of commerce.

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* It must be the fellow to this feather that Beckford saw in the Escurial, and which was said to come from the wing of the Archangel Gabriel. He describes it (*Letters from Spain*, let. xi.) as 'the most glorious specimen of plumage ever beheld in terrestrial regions, full three feet long, and of a blushing hue, more soft and delicate than that of the loveliest rose.'

† The writer wishes it to be recorded for the information of posterity, that since writing the above sentence, he has found at Oxford a very learned scholar who, at this very time (June, 1840), seriously believes in the existence of the phœnix.

The date-palm being diœcious, that is, the stamens and pistils, or the male and female parts being not only in different flowers, but even on different plants, the crops entirely fail, or the fruit is worthless and unfit for food, if fertilization is in any way prevented. To ensure this, the Arabs have long been in the habit of hanging the clusters of male flowers on the trees which bear only female ones, and therefore the date-tree is one of those which led to a knowledge of the sexes of plants.

The extensive importance of the date-tree is, says Dr. Clarke, one of the most curious subjects to which a traveller can direct his attention. A considerable part of the inhabitants of Egypt, Arabia, and Persia subsist almost entirely on its fruit. They make a conserve of it with sugar, and even grind the hard stones in their hand-mills for their camels. In Barbary they form handsome beads for paternosters of these stones. From the leaves they make couches, baskets, bags, mats, brushes, and fly-traps; the trunk is split and used in small buildings, also for fences to gardens, and the stalks of the leaves for making cages for their poultry. The threads of the web-like integument at the bases of the leaves are twisted into ropes, which are employed in rigging small vessels. The sap is obtained by cutting off the head of the palm and scooping out a hollow in the top of the stem, where, in ascending, it lodges itself. Three or four quarts of sap may be obtained daily from a single palm, for ten days or a fortnight, after which the quantity lessens, until, at the end of six weeks or two months, the stem is exhausted, becomes dry, and is used for firewood. This liquor is sweetish when first collected, and may be drunk as a mild beverage, but fermentation soon takes place, and a spirit is produced, which is distilled, and forms one of the kinds of aruk (arrack), or spirit of Eastern countries. Such being the importance and multiplied uses of the date-tree, it is not surprising that in an arid and barren country it should form so prominent a subject of allusion and description in the works of Arab authors, and that it should be said to have 300 names in their language. Many of these are however applied to different parts of the plant, as well as to these at different ages.

Phœnix sylvestris is a species common in the arid parts of India, and there commonly called *khujjoor* by the natives, and the date-tree by Europeans, which it resembles in appearance. In its parts of fructification it is like the following species, but differs in growing to be a tree, with a tall pretty thick trunk and large yellowish or reddish fruit. It yields tarri, or palm wine, commonly called toddy. The mode of obtaining this is by removing the lower leaves and their sheaths, and cutting a notch into the centre of the tree near the top, from which the liquor issu[illegible] and is conducted by a small channel, made by a bit o[illegible]he palmyra-tree leaf, into a pot suspended to receive it. This juice is either drank fresh from the tree, or boiled down into sugar, or fermented for distillation, when it gives out a large portion of spirit, often called *paria aruk*. Mats and baskets are made of the leaves.

Sugar has always been made from this species, and accounts of it have been given by Drs. Roxburgh and Buchanan Hamilton. Date-sugar is not so much esteemed in India as that of the cane, and sells for about one-fourth less. It has been imported in considerable quantities into this country of late, but is not distinguished from the cane sugar. Dr. Roxburgh calculated, forty years ago, that about 100,000lbs. were made annually in all Bengal. At the age of seven or ten years, when the trunk of the tree is about four feet high, it begins to yield juice, and continues productive for twenty or twenty-five years. The juice is extracted during the months of November, December, January, and February, during which period each tree is reckoned to yield from 120 to 240 pints of juice, averaging 180 pints. Every twelve pints or pounds is boiled down to one of goor or jagari, and four of goor yield one of good sugar in powder, so that the average produce of each tree is about seven or eight pounds of sugar annually.

P. farinifera is a dwarf species of this genus, which is a native of dry ground or sandy hills, not far from the sea on the Coromandel coast. It flowers in January and February, and the fruit ripens in May. The leaflets are wrought into mats for sleeping on, and the common petioles are split into three or four, and used for making baskets. The small trunk is generally about fifteen or eighteen inches long, and about six in diameter. It encloses in its substance a large quantity of farinaceous substance, which the natives use for food in times of scarcity. To procure this meal, the small trunk is split into six or eight pieces, and dried and beaten in wooden mortars till the farinaceous part is detached from the fibres; it is then sifted, to separate them: the meal is then fit for use. The only further preparation which this meal undergoes is the boiling it into a thick gruel, or canji. It seems to possess less nourishment than common sago, which is obtained in a similar manner from another palm, and is less palatable when boiled, but it has saved many lives in times of scarcity.

PHŒTHORNIS. [TROCHILIDÆ.]

PHOLADA'RIA, Lamarck's name for a family belonging to the division of *Dimyarian Conchifers*, which he has termed *Crassipèdes*, and consisting of the genera *Pholas* and *Gastrochæna*; but M. Deshayes, in the last edition of the *Animaux sans Vertèbres*, remarks that this family can no longer remain in the same state as that which Lamarck assigned to it. The *Gastrochænæ*, he observes, are, as he had already stated, true *Fistulanæ*, and if either of the genera, *Gastrochæna*, or *Pholas*, be elected, the other must disappear. [GASTROCHÆNA.] He suggests that the genus *Pholas* alone should remain, unless the evident relations which connect it with *Teredo* and *Teredina* should render it necessary to unite all three genera into one natural family. [PHOLAS.]

PHOLADIDÆA. [PHOLAS, p. 109.]

PHOLADOM'YA. 'Qu'est-ce que le genre Pholadomie de quelques auteurs Anglois? C'est ce que nous ignorons; il paroît qu'il est établi avec une coquille fossile cunéiforme, très-large et très-bâillante en avant.' We will endeavour to answer the question thus put by M. de Blainville in his 'Malacologie.'

The genus *Pholadomya* is a most interesting form, for the knowledge of which we are indebted to Mr. G. B. Sowerby, who described it from a recent species brought from the island of Tortola by Mr. Nicholson, and in the possession of Mrs. Mawe, from whom it passed into Mr. Broderip's collection, and consequently is now in the British Museum.

The discovery of this recent species led at once to the more perfect knowledge of several fossils, whose genus, as Mr. Sowerby observes, in his *Genera* (No. xix.), was before exceedingly doubtful, insomuch that from a consideration of their external appearance alone, authors had been induced to place them in several genera, to none of which they really belonged; and he refers to Sowerby's *Mineral Conchology*, t. 197, 225, 226, 227, 299, and 327, where several of the species are figured under the names *Cardita? producta*, *obtusa*, *lyrata*, *deltoidea*, and *margaritacea*; and *Lutraria lyrata*, *ovalis*, *ambigua*, and *angustata*. These occur in several rocks of the oolitic series, particularly the cornbrash, inferior oolite, and fullers' earth; as well as in the lias, the London clay, and the Sutherland coal-field; also in the dark-coloured clay at Alum Bay.

Generic Character.—*Shell* very thin, rather hyaline, transverse, ventricose; inside pearly; posterior side short, sometimes very short, rounded; anterior side more or less elongated, gaping; upper edge also gaping a little. Hinge with a small, rather elongated, triangular pit, and a marginal lamina in each valve, to the outer part of which is attached the rather short external ligament. Muscular impressions two: these, as well as the muscular impression of the mantle, in which there is a large sinus, are indistinct. (G. B. Sowerby.)

The same zoologist remarks that this shell is the only instance known to him in which the umbones are so approximated as to be worn through by the natural action of the animal in opening and closing its valves. He further observes that the general aspect of this shell is between that of *Pholas* and *Anatina* of Lamarck, but most of the fossil species have been arranged as *Lutrariæ*. 'We have called it,' says Mr. G. B. Sowerby, '*Pholadomya* with reference to its resemblance to shells of two Linnean genera, the *Pholades* and *Myæ*. It is related to *Panopæa* in the characters of the hinge, but may be distinguished from that genus by its thin, semitransparent, pearly shell; from *Pholas* and *Anatina*, by its external ligament, and its want of external and internal accessory valves; and lastly, from the Lamarckian *Myæ*, by not having the unequal teeth of that genus.'

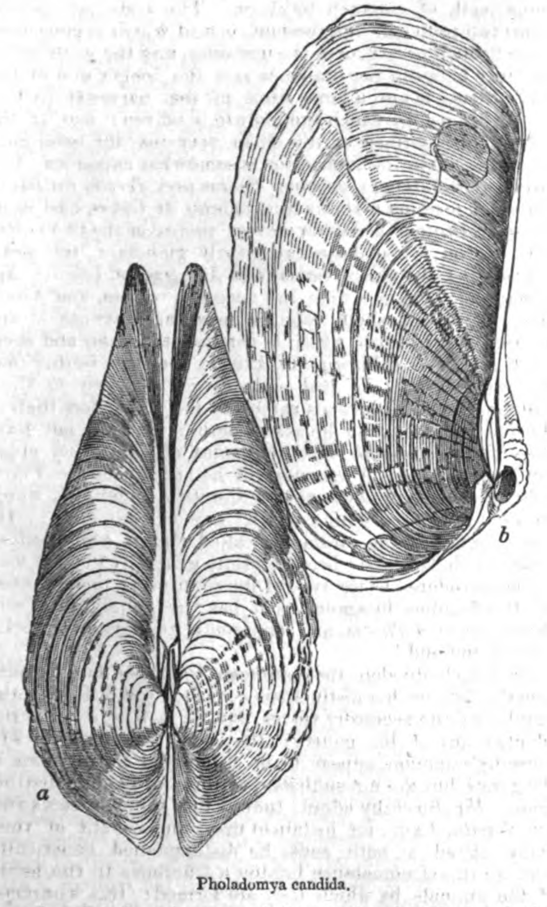
M. Deshayes, with his usual acuteness, saw at once the value of Mr. G. B. Sowerby's characters, and incorporated the genus *Pholadomya* in the new edition of Lamarck's *Animaux sans Vertèbres*, placing the form between *Solecurtus* of De Blainville and *Panopæa*.

But since the publication of the observations of the zoologists above given, Mr. Samuel Stutchbury has favoured us with a sight of the animal of the only recent species known—that on which Mr. G. B. Sowerby founded his generic description of the shell. This valuable specimen is now in the hands of Professor Owen, to whom we are indebted for the following description.

Animal of Pholadomya. '*Pholadomya* presents all the family characters of the *Inclusa* or *Enfermês*, but differs generically from all those, the organization of which has hitherto been described, by the presence of a fourth aperture leading to the interior of the mantle, that is to say, besides the linear slit for the protrusion of the narrow foot at the anterior part of the ventral aspect of the mantle and the two siphonic tubular passages, there is, at the under or ventral part of the base of the united siphons, a small round aperture, which is continued upon a truncated pyramidal papilla projecting into the pallial cavity, forming a valvular obstruction to the exit of fluids, but admitting their entry. This doubtless relates to some curious and peculiar feature in the œconomy of the mollusk: the foot is compressed, ½ inch long, 3 lines broad; the siphonic tube 2 inches long, ½ inch in diameter, bifid at the extremity; the labial appendages short; the two *branchiæ* of each side conjoined, and those of the right united to those of the left side along their posterior fourth. More of the anatomy I have not at present worked out; but there is enough, I think, here stated to serve as an answer to M. de Blainville's question.'

Example, *Pholadomya candida* (G. B. Sowerby).

Description.—Shell transversely oblong, very short posteriorly, rounded; median part marked with divaricated, decussate striæ, which are decurrent from the umbo; anteriorly elongated, subquadrate. (G. B. S.)



Pholadomya candida.

a, valves shut, the umbones towards the spectator; *b*, inside view of valve, showing the impressions and the umbo worn through.

Locality.—Marine, and, most probably, in deep water. The specimen from which Mr. Sowerby characterised the genus was thrown upon the beach at Tortola after a hurricane.

M. Deshayes, in his Tables, makes the number of living species one, and that of the fossil species (tertiary) the same. In the last edition of the *Animaux sans Vertèbres*, he records but three fossil species—*Pholadomyæ obtusa*, Sow.; *angulifera*, Desh.; and *producta*, Sow.; the first being *Cardita obtusa*, 'Min. Con.;' the second *Mya angulifera*; and the third *Cardita ? producta*, and *Pholadomya producta* of the same work. Our catalogues however contain numerous species. Thus we have, for example, *Pholadomya Murchisoni*, from the Inverbrora coal-pits and beds overlying coal upon the shore (Murchison 'On the Coal-field of Brora in Sutherlandshire,' &c., *Geol. Trans.*, vol. ii., 2nd series); *Pholadomya margaritacea*, from the arenaceous limestone or sandstone of Bognor, and another marked with an asterisk, indicating that it was either not in the possession of the author or not examined by him, from the Shanklin sand (Mantell, 'Tabular Arrangement of the Organic Remains of the County of Sussex,' *Geol. Trans.*, vol. iii., 2nd series); *Pholadomyæ decussata, Murchisoni, ovalis, producta, nana, deltoïdea, simplex, obsoleta, acuticostata*, and *obliquata*, from the Speeton clay, cornbrash, Bath oolite, calcareous grit, Kelloway's rock, and Oxford clay, &c. (Phillips, *Description of the Strata of the Yorkshire Coast*); *Pholadomyæ ambigua* from the lias, an unnamed species from the inferior oolite, *lyrata* from the fuller's earth, and *producta* and *lyrata* from the cornbrash (Lonsdale, 'On the Oolitic District of Bath,' *Geol. Trans.*, vol. iii., 2nd series); and *Pholadomya deltoïdea*, from the Oxford oolite, and other unnamed species from the gault and lower green-sand. (Fitton, 'On the Strata below the Chalk,' *Geol. Trans.*, vol. iv., 2nd series).

PHOLÆO'BIUS, Dr. Leach's name for a part of the genus *Saxicava* of authors. [LITHOPHAGIDÆ, vol. xiv., p. 50.]

PHOLARITE—*Hydrated Silicate of Alumina.* This substance occurs in small pearly scales, which are usually convex. These are white, soft, and friable, and they adhere to the tongue.

This substance occurs in the department of Allier in France, in the coal formation of Fins.

PHOLAS, a name given by Linnæus to a genus of conchifers, placed by Lamarck in his family *Pholadaria*. [PHOLADARIA.]

Generic Character.—Animal more or less thick and elongated, rarely shortened; mantle reflected on the dorsal part, for the purpose of tying together the valves and the accessory pieces; anterior aperture rather small; foot short, oblong, and flattened; siphons often elongated and united into a single, very extensible, and dilatable tube; mouth small, with very small labial appendages; branchiæ elongated, narrow, slightly unequal on each side, united on the same line nearly throughout their length, and prolonged even into the siphon.

Shell delicate, milky white, rather transparent, covered sometimes with a thin epidermis, oval, elongated, inequilateral, gaping posteriorly, and especially at the antero-inferior part; umbones hidden by a callosity; hinge toothless, ligament doubtful?;* a flat, recurved, spoon-shaped process enlarged at its extremity, elevating itself within each valve below the umbo; muscular impressions very distant, the posterior one large, oblong, elongated, always very visible, the anterior one small, rounded, but little distinct, both more or less approximated to the edge, particularly the anterior edge, of the shell, and joined by a pallial impression, which is long, narrow, and deeply excavated backwards.

Many accessory pieces or none? sometimes a calcareous tube enveloping all the parts, but leaving an aperture backwards. (Rang.)

M. Rang remarks that if the species which compose the genus *Pholas* were better known, they might be divided into many well characterised groups according to the number and disposition of the accessory pieces, which vary considerably; but unfortunately these accessory pieces are well known in a small number of species only. Besides, he observes, the genus is so imperfectly ascertained, although found in great abundance on the coasts of France, that naturalists are not yet agreed as to the number of mus-

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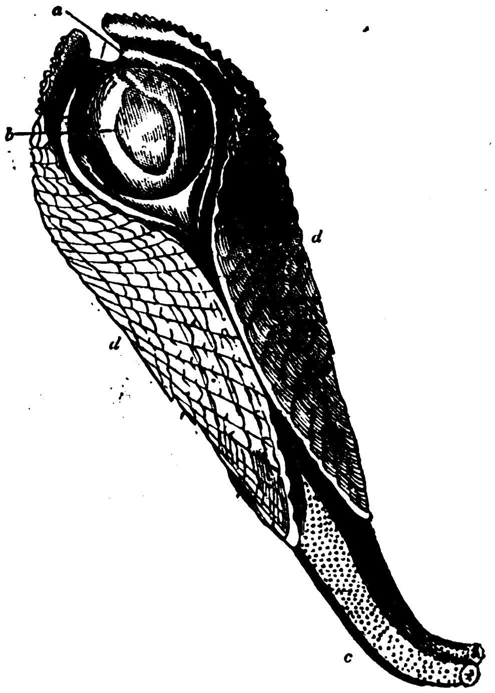
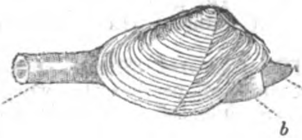
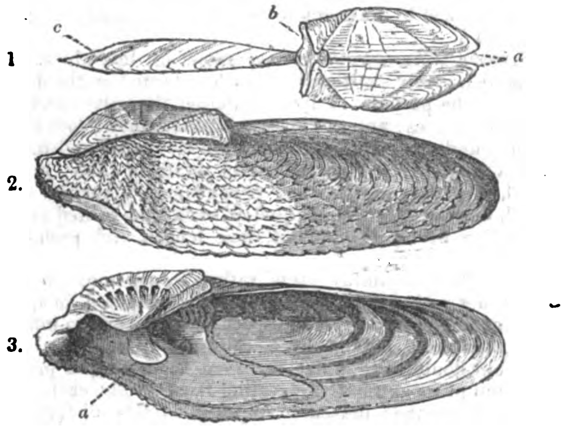
* See post, pp. 107. 108.



Pholas Dactylus (animal and shell); the lower or ventral parts are presented to the spectator.
a, mantle; *b*, foot; *c*, tube; *dd*, shell.



Animal of a Pholas (Julan—Pholas clavata? Lam.) from Adanson—side view.
a, tube; *b*, mantle; *c*, foot.



Shell of Pholas Dactylus.

1, Accessory valves: *a*, anterior pair; *b*, central piece; *c*. posterior piece. 2, Exterior view of shell, side view. 3, Internal view of valve: *a*, Spoon-shaped process.

cular impressions. Lamarck places the *Pholades* among the *Dimyaria*, and M. de Blainville sees but a single muscular impression: but M. Rang, speaking for himself, says that he has no doubt that these shells have two muscular impressions, which he has positively traced in *Pholas costata*, in following the pallial impression from its departure from the posterior muscular impression, which is always sufficiently evident, to the point where the former terminates anteriorly. There a small irregularly rounded impression may be very well distinguished. It has, continues M. Rang, been equally observed by M. Charles des Moulins in the same species, but science owes to that naturalist an observation relative to the *Pholades* perhaps even more important; it is, that these shells sometimes are seen accompanied by a calcareous tube, applied, like that of the *Gastrochænæ*, to the internal wall of the cavity which they inhabit. M. Rang had not been able to verify this fact in relation to living species; but M. des Moulins showed him several fossils from Mérignac, in which he completely recognised this important character, which more firmly establishes the generally admitted relationship between the *Pholades*, the *Teredinæ*, and the *Fistulanæ*. M. Rang further remarks that there are some species of *Pholades* which seem to lead to *Teredo*. These shells inhabit stones, madrepores, wood, and sometimes mud or sand (vase). When the reflux of the sea leaves them, and the animals are disquieted, they eject through their siphon to a considerable distance the water contained in their mantle, and which bathes the gills. (*Manuel de l'Histoire Naturelle des Mollusques.*)

'We believe,' says Mr. G. Sowerby, 'that all the shells of this genus are furnished with a greater or less number of accessory valves, which appear to be caused by the deposition of shelly matter (within the epidermis, and connected with the valves by that membrane), wherever such valves were necessary for the security of the inmate; they are consequently very various in form, and placed in different situations in the different species, though in most cases they are placed near the hinge, and have ever been considered to be substitutes (in these shells) for the permanent ligament of other bivalves: we must, for the present, withhold our assent from this opinion, because, on account of the situation in which they live, the animals inhabiting these shells can have very little occasion to open their valves. Whether or not there is any permanent ligament in this genus, as we have never observed the animal alive, we cannot undertake to determine: Turton says it has none; Lamarck, on the contrary, speaks of the accessory valves covering and hiding the ligament. As far as we can form an opinion from dried specimens, we cannot consider the substance to which these valves are attached as the ligament, but as part of the adductor muscle; nevertheless we think we can in some species perceive a very small internal ligament, attached to two unequally sized small curved teeth (one in each valve), placed in the same situation as the hinge teeth of common bivalves. The adductor muscle forms two principal impressions, one of which is placed on the reflected margin, over the umbones, and the other about half-way between the umbones and the longer end of the shell: there is also a large sinus in that narrower part of its impression by which the mantle is affixed; and at the angle that is formed by this sinus, very near the basal margin of the shell, the impression is somewhat expanded. The principal differences between *Pholas* and *Teredo* consist in the latter forming a shelly tube behind its valves, and in its being destitute of accessory valves; moreover the two valves of this latter, when closed, are nearly globular: the same characters distinguish *Pholas* from *Xylotrya* of Leach: *Xylophaga* of Turton, which has accessory valves, and which does not form a shelly tube, is however destitute of the internal curved tooth, which is common to *Pholas* and several *Tubicolées*.' (*Genera*, No. xxiii.) The same author (*loc. cit.*) remarks that he had endeavoured formerly to show that *Gastrochæna* belongs rather to the *Tubicolées* than to the *Pholadaires*; and he asks whether it would not have been more consistent with the rules of association apparently entertained by Lamarck, if he had united the *Petricolæ*, *Venerirupes*, and other terebrating conchifera, which do not form a shelly tube open at one or both ends? He also inquires if the commonly called *Pholas papyracea* (a shell which had lately become pretty generally known) may not be considered as the type of the connecting link between the two families, inasmuch as it has the general form and characters of a *Pholas*, and apparently commences a shelly tube at one end?

Dr. Leach divided the Linnæan *Pholades* into several genera; but as his distinctions consisted principally in the number of the accessory valves, Mr. G. B. Sowerby has not adopted any of his genera: they may, according to Mr. Sowerby's opinion, appear to be calculated for divisions of the genus, but are not sufficiently strong for generic distinctions. Mr. Sowerby admits indeed that some species (*Pholas clavata*, Lam., for instance) may, on account of their being closed at both ends, be distinguished generically, because this circumstance implies a difference in the habits of the animals by which they are formed: this character therefore, he remarks, has been seized by Dr. Leach, and upon it the doctor founded his genus *Martesia*, an example which Mr. Sowerby says he should have been induced to have followed, had he been convinced of its necessity. The same acute and experienced naturalist, upon the occasion of describing several new species of *Pholas* from the collection formed by the zealous Hugh Cuming, chiefly on the western coast of South America and among the islands of the South Pacific Ocean, prefaces his descriptions with the following admonition, which is well worthy of the attention of those who are interested in this branch of natural history:—

'The utmost caution is necessary in the examination and description of the various sorts of *Pholades*, on account of the extraordinary difference in the form of the same species in different stages of growth. The addition of accessory valves also, as they increase in age, must be carefully observed, in order to guard against too implicit a confidence in their number and form; and though I might be considered guilty of asserting a truism by stating that the difference in size of different individuals of the same species may, and sometimes does, mislead the tyro in the science of malacology—lest such difference should mislead the adept also, let him too proceed cautiously; and where he finds a fully grown shell of half an inch in length agreeing perfectly in proportions and characters with another of two inches long, let him not conclude that it is a distinct species; but if he can find no other difference except that which exists in their dimensions, let him consider the one a giant, the other a dwarf. Let it be remembered that among the *Cypræœ* it is not uncommon to observe young shells of three inches in length, and fully grown ones of the same sort only one inch in length; likewise of the well-known British *Pholades*, there are individuals quite in a young state of two inches in length, and perfectly formed shells of the same species not more than half an inch long. For instance in demonstration, I need only refer to the *Pholas papyraceus*, so abundant at Torquay, of which the young shells have been considered by many as a distinct species, and have been named by Dr. Turton *Pholas lamellosus*. This varies in size exceedingly, so that it may be obtained both in an incomplete and young state, and in a fully grown condition from half an inch to nearly two inches in length. The circumstance of its having rarely occurred in an intermediate state of growth, when the anterior opening is only partly closed, and the accessory valves only partly formed, led Dr. Turton and others to persist in regarding the young and old as two distinct species. Other similar instances will be shown in the course of the present concise account of some hitherto undescribed species of the same genus brought to England by Mr. Cuming.' (*Zool. Proc.*, 1834.)

Before we proceed any further, it becomes necessary to notice the genus *Jouannetia* of M. Ch. des Moulins, which is thus characterised:—

Animal unknown, but having, certainly, the characters of the family.

Shell spherical, cuneiform, equivalve, inequilateral, hardly gaping posteriorly, but widely open anteriorly; valves solid, short, curved, pointed below, striated obliquely, the striæ converging towards a median furrow; umbones but little distinct, with accessory pieces soldered over them; a very large, smooth, delicate, fragile scutcheon enveloping, with age, all the anterior part, formed of two rather unequal halves, fitting (s'emboîtant) one in the other, each soldered by one of their edges to one of the valves, and closing in this manner the anterior gape of the shell; no ligament nor hinge (engrenage); a setiform vertical appendage proceeding from the umbo, soldered to the interior of each valve, and occupying a third of its height; muscular impressions still unknown; pallial impression very strong, and deeply excavated backwards. Accessory pieces, but soldered; no enveloping calcareous tube, the large scutcheon occupying its place.

M. Rang speaks highly of the discovery of this genus by M. des Moulins, and having studied it with that naturalist, he pronounces it to be very distinct from the *Pholades*, and its place to be clearly fixed betweeen them and the *Teredines*, to which it leads so naturally by its valves. *Jouannetia*, he observes, has no enveloping calcareous tube, as sometimes happens to the *Pholades*, &c.; and though only one species is yet known (*Jouannetia semicaudata*, fossil, from the faluns of Mérignac, in the interior of madrepores, &c.), he does not think that a similar tube ever exists, if the amplitude and disposition of the scutcheon, which appears to him to take its place, is a generic character.

M. Deshayes, in the last edition of the 'Animaux sans Vertèbres,' does not think quite so highly of the genus *Jouannetia*, as we shall presently see. With regard to the accessory pieces of the *Pholades*, he considers that they are no other than vestiges of the complete tube of the *Teredines;* and this opinion, he observes, may rest upon the fact that those pieces are larger in proportion as the shell is more gaping posteriorly, and the external parts of the animal of greater size; so the shell of the *Teredines* being able to cover only a very small part of the animal, that defect is supplied by a great tube: on the contrary, in proportion as the shell of the *Pholades* is better closed, the number and size of the accessory pieces diminish. M. Deshayes then goes on to remark that, according to Lamarck, these pieces cover the ligament which is external; but M. Deshayes is convinced, both from the observations of Poli and his own, that the *Pholades* have no true ligament; and the same is the case with the *Teredines*. A part of the anterior muscle is inserted on the cardinal callosities, and occupies the place of the ligament. A posterior expansion of the mantle glides between these callosities, penetrates into the porous tissue placed below the callosities, and forms externally a fleshy surface more or less great, on which the posterior pieces are fixed. With regard to the internal appendages springing from the umbones, and which have somewhat the form of little spoons, they are buried in the thickness of the animal, and embrace in their concavity a part of the liver, the heart, and the intestine. M. Deshayes dismisses the genera *Xylophaga* and *Jouannetia* very shortly; the first he rejects as useless, nor can he allow that the last has more just claims to admission. If, he observes, genera so slightly characterised as these are were to be adopted, there would be as good reason for making a particular genus of each of the speces of *Pholas*.

Mr. Swainson makes the *Pholidæ* the first family of his tribe *Macrotrachiæ*, and thus characterises that family:—

'Shell bivalve, sedentary, generally perforating, opening at one or both ends; the valves often prolonged into a shelly tube, sometimes of great length, representing the *Tubulibranchia*.'

Under this family he assembles several forms, and makes it consist of the following genera and subgenera:—

1, *Aspergillum;* including the subgenera *Aspergillum*, *Clavagella*, and *Fistulana*.

2, *Gastrochina* (*Gastrochæna*), Lam.

3, *Pholadomya*, Sow.

4, *Pholas*, Linn., with the subgenera *Pholas*, Linn., *Pholidæa*, Leach, *Martesia*, Leach, and *Xylophaga*, Sow.; and

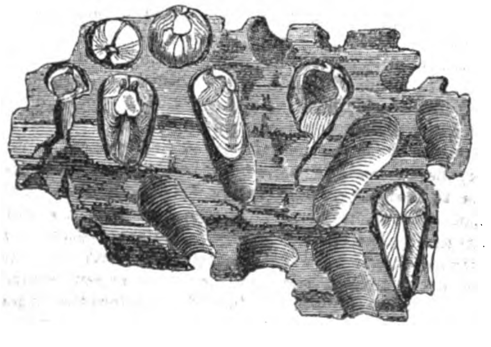
5, *Teredo*, Linn., with the subgenera *Teredo*, Linn., and *Teredina*. (*Malacology*, 1840.)

Locality, Habits, Organization, &c. of the genus *Pholas*.—The geographical distribution of the *Pholades* is very wide, and their habit of boring hard substances, such as indurated mud or clay, wood, and stone, renders them, as well as other terebrating testaceans, an object of anxious interest to those who construct submarine works. The Breakwater at Plymouth was soon attacked by the *Pholades*, and in Dr. Goodall's fine collection, now dispersed by the hammer, there was a specimen from the Breakwater perforated by these testaceans. Wood is also attacked by this genus, and submarine piles are consequently exposed to their ravages. To counteract their operations in the latter substance, nails closely driven into the submerged part of the timber, as in the piles which support the pier at Southampton, seem to be the best safeguard hitherto applied. When unmolested, the young *Pholades* excavate burrows in the substance which chance has opposed to them, or to which choice—for it is not improbable that the young shell-fish may in some cases have the faculty of making the selection of the material in which it is to pass the whole of its life—has directed it.

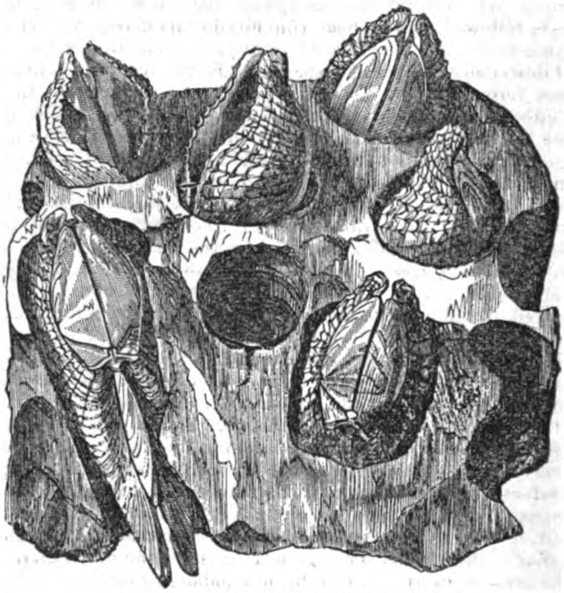
The mode in which this operation of boring is conducted is not quite satisfactorily accounted for; but the better opinion seems to be that in this, as in other excavating testaceans, the currents of water produced by the vibratile cilia of the animal, as noticed by Mr. Garner, are the principal agents. [LITHOPHAGIDÆ: see also CLAVAGELLA and GASTROCHÆNA.] Mr. G. B. Sowerby, in his description of *Pholas acuminata*, found by Mr. Cuming at Panamà in limestone at low water, notices one specimen in that gentleman's collection, as demonstrating a fact of considerable importance to geologists: it is in argillaceous limestone, very much resembling lias, and, in forming the cavities in which it resides, it has, by such chemical process as, in Mr. Sowerby's opinion, frequently takes place, absorbed a much greater quantity of the rock than could be retained or converted; this is again deposited at the upper part of the cavity, and thus the rock is recomposed. (*Zool. Proc.*, 1834.) Mr. Garner, in his valuable paper 'On the Anatomy of the Lamellibranchiate Conchifera' (*Zool. Trans.*, vol. ii.), remarks, that there is a cartilage between the two small spinous processes of the hinge in the *Pholas candidus.* In other species which have no rudiment of it, and allied genera which have a particular character of articulation, he considers the motion of the valves as but a secondary cause in the perforation of the substances in which these animals are found. His strictures on the opinions of M. de Bellevue and Mr. Osler with regard to the crypts of *Saxicava* will be found under our notice of that animal in the article LITHOPHAGIDÆ [vol. xiv., p. 51]; and he follows them up by observing that Turton says the valves of the *Teredo* do not correspond with the bore, though Mr. Garner thinks that in this case they do act as mechanical instruments: but, he adds, the *Pholas conoïdes* is often found in hard timber, though its valves do not seem in the least adapted for any boring or filing. See further on this point Mr. Garner's observations on the subject of a supposed solvent fluid in the description of *Lithodomus.* [MYTILIDÆ, vol. xvi., p. 49.] Mr. G. B. Sowerby had previously (*Genera*, No. xxiii.) remarked that the manner in which these and other perforating shells produce the cavities in which they live had long been subject to controversy, and observed that, as he did not wish to add himself to the number of disputants, he would only state that the effect cannot be produced by rotatory motion, since the cavities are fitted to the shape of the shell, and since animals whose shells are perfectly smooth on their outside are equally capable of producing these cavities with others whose external surfaces are rough like a file; nor did he think it could be by the chemical action of any solvent, since the same effect is produced on wood, limestone, and sandstone. He stated that he had been informed that the *Teredo* eats its way into wood, and inquires whether the *Pholas* and others perforate wood, chalk, limestone, and even sandstone in the same manner? or have some of them the power of dissolving stone, while others form their cavities by eating away wood?

Mr. Garner (*loc. cit.*) mentions *Pholas* as one of the genera in which supplementary branchiæ exist, and as one of the forms in which a disposition of those organs different from that observed in *Anomia, Pecten, Arca, Modiola, Unio,* and *Cardium*, &c., where no complete division of the sac of the mantle exists, is found. In *Pholas* the branchiæ are prolonged into the inferior siphon, and as they are not separated from the base of the foot within nor from the mantle without, the water drawn in through the inferior orifice must make its exit by the same or by the anterior opening: but water is likewise drawn in by the superior siphon, and so gets access to the interior interlaminary spaces of the branchiæ (oviducts of some); and by this superior siphon the *ova, fæces*, and secretions are discharged. He also remarks, in another part of his paper, that the oviduct is distinct from the sac in *Modiola, Mytilus, Lithodomus*, &c., whilst in *Tellina, Cardium, Mactra, Pholas, Mya*, and most others, the *ova* are discharged into the excretory organs.

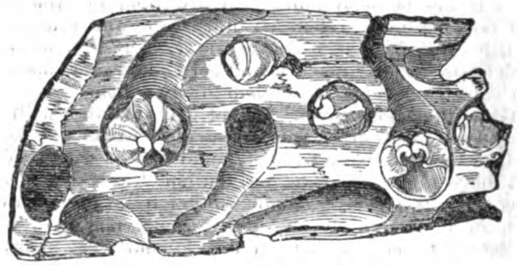
To return to the perforating habits of these animals. The accompanying cuts will convey some notion of their ravages upon the substances which they penetrate:—



Pholas striatus in wood.



A block of stone perforated by Pholas Dactylus.



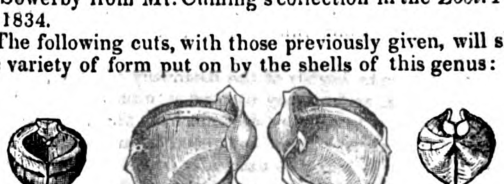
Pholas (Xylophaga) dorsalis in wood.

Pholas has been found at depths varying from the surface to seventeen fathoms, and *Xylophaga* from the surface to forty-five fathoms.

The soft parts of *Pholas Dactylus* and *Pholas crispata* are well shown in the preparations 132, *a, b, c,* and *d*, in the museum of the College of Surgeons (*Preparations of Nat. Hist. in Spirit*).

The species are numerous, and some are very abundant on our own coasts. 'Of these,' says Mr. G. B. Sowerby, '*Pholas crispata, Dactylus, candida,* and *parva*, are the most common; several others are described by Turton, in his *British Bivalves*, of which we are quite convinced the *P. lamellata* is only the young of *P. papyracea:* we are not acquainted with his *P. tuberculata.* Much confusion appears to prevail in regard to several very distinct species among these we believe the *papyracea* of Turton is the *striata* of Montagu; the *clavata* of Lamarck is the *striata* of Linnæus, but not of Mont.'* The number of living species of *Pholas* noted by M. Deshayes in his Tables is fifteen, and of these one, *P. candida*, is recorded as living and fossil. In the last edition of Lamarck, ten species only (including *Xylophaga*) are recorded: this, notwithstanding the errors which have been committed by those who have taken difference of size or age for specific difference, must be far below the mark. For instance, we do not find, in the work last referred to, any of the nine species described by Mr. G. B. Sowerby from Mr. Cuming's collection in the *Zool. Proc.* for 1834.

The following cuts, with those previously given, will show the variety of form put on by the shells of this genus:



Xylophaga dorsalis.

a, enlarged view of interior; *b*, dorsal view, nat. size; *c*, ventral view, nat. size.

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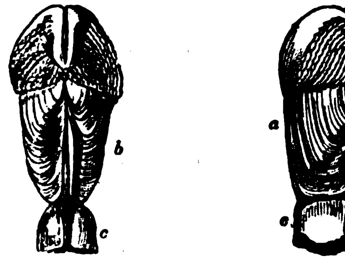
* Zoologists sometimes make the word 'Pholas' masculine, sometimes feminine. Linnæus made it masculine, and so it should be considered.

This species, which is found in cylindrical cavities eaten? in wood (see cut at p. 108), bears some resemblance to *Teredo*, but is without the shelly tube, nor has it the posterior hiatus.



Pholas papyraceus.
a, side view; *b*, dorsal view; *c*, cup-shaped membrane.

This is the genus *Pholadidæa* of Leach.

Fossil Pholades.

Mr. G. B. Sowerby (*Genera*) observes that fossil *Pholades* are rare, but that they occur in the calcaire grossier and contemporaneous formations, in several places, and also in our crag: several very interesting specimens, he adds, are found in Italy and in Touraine, as well as in the vicinity of Paris, where these and several other perforating shells have been discovered in a fossil state in the cavities which they have themselves formed. M. Deshayes, in his Tables, gives the number of fossil species (tertiary) as nine; but in the last edition of Lamarck only two appear: one, *P. candida*, recent and fossil; the other, *Pholas Jouanneti* (*Jouannetia*), fossil only. In Professor Phillips's *Illustrations of the Geology of Yorkshire*, we find *Pholas recondita* and *P. constricta* recorded; the first from the coralline oolite, the second from the Speeton clay. In Dr. Fitton's list (*Strata below the Chalk*), we find *Pholas? gigantea* and *prisca* noted; the first from the gault and the lower green-sand, the second from the lower green-sand and Blackdown.

PHONE'MUS, De Montfort's name for a genus of microscopic *Foraminifera*. [Foraminifera, vol. x., p. 348.]

PHONY'GAMA, M. Lesson's name for a genus of birds placed by Mr. Swainson in the subfamily *Corvinæ* of his family *Corvidæ*.

Generic Character.—*Bill* large, strong, considerably compressed; very high at the base, gradually narrowing towards the end; the front advancing on the crown of the head, and considerably dividing the frontal plumes; upper mandible distinctly notched. *Nostrils* very large, placed in a deep depression of the bill; the aperture large, oval. Frontal feathers short, reflected forwards. *Tail* moderate, rounded; the feathers broad, truncate, and ending in setaceous points. (Sw.)

Example, *Phonygama Lessonia* (*Voy.*, pl. 13).

PHORCY'NIA. [Pulmograda.]

PHO'RMIUM, a genus of plants of the natural family of Liliaceæ, tribe Agapantheæ of Endlicher, Asparageæ of Lindley, contains only a single species, which is remarkable for its useful product, so well known under the name of New Zealand flax, and which is found indigenous in New Zealand and Norfolk Island. The genus is characterised by having a coloured tubular perianth, of which the tube is very short, and divides into six segments, of which the three inner are the longest; stamens six, inserted into the base of the tube, ascending exserted; capsule oblong, three-cornered; seeds numerous, compressed; embryo in the centre of the seed, longer than half the albumen, with its radicle next the umbilicus. The root is tuberous, fleshy, and bitter tasted; the leaves are numerous, all radicle, linear-lanceolate, five or six feet long, and from one and a half to two inches broad, two-rowed, equitant at the base, leathery, and very tough. Its flowers are numerous, showy, yellow-coloured, arranged on a tall branch panicle.

The leaves of this plant yield a very beautiful and a very strong fibre, which has been of late imported in considerable quantities under the name of New Zealand flax. It was expected to be much more useful than it has proved to be, in consequence of its having the defect of breaking easily when made into a knot. Being a plant of high southern latitudes, it was supposed that it might easily be grown in different parts of Europe. The French have attempted to cultivate it near Cherbourg, Toulon, and other places, and it has been introduced into Ireland, of which the moist insular climate is probably favourable to its growth. It grew remarkably well for a number of years in the Chelsea Botanic Garden, but was killed by the severe winter of 1837-38. Its cultivation has also been attempted in Australia, but has not yet succeeded to any extent.

PHO'RUS, De Montfort's name for the trochoid form which is loaded with pebbles, shells, &c. (*Trochus agglutinans* of authors, genus *Onustus*, Humph.), generally known to collectors by the name of *Carrier Shells*. [Trochidæ.]

PHOS, De Montfort's name for a genus of turbinated gastropods with a turrited thick shell, which is carinated and varicose; spire pointed, but not produced; aperture rounded or oval; outer lip ridged internally; columella with an oblique plait or plaits; canal short, with the external form of a raised varix. The notch at the extremity of the columella brings this shell into the group of *Entomostomata*, and the raised external surface of the columella very near to *Buccinum;* but the general aspect of most of the species more resembles that of *Murex;* there can hardly however be said to be any true varices on the whorls, the elevations are rather ribs or bars.

Example.—*Phos senticosus.*

PHOSGENE GAS. [Chlorocarbonic Acid Gas.]

PHOSPHORIC ACID. [Phosphorus.]

PHOSPHORIC ACID, MEDICAL PROPERTIES OF. Dry phosphoric acid is sometimes used in the form of pills, but this is not an eligible mode; the common form is that of solution, constituting the dilute acid of the 'Pharmacopœia.' This differs from the other dilute mineral acids in not affecting so strongly the digestive organs, on which account it may be persevered in for a longer time. It is peculiarly suited to disordered states of the mucous surfaces, and also to states of debility, characterised by softening of the bones and a phosphatic condition of the urine. In this latter state it is often more efficacious when combined with iron, in the form of a phosphate of that metal. The same combination is of great utility in most cases of diabetes. In passive hemorrhages, phosphoric acid, properly diluted, quickly arrests the bleeding, as it coagulates the blood. This property is possessed in a stronger degree by the undiluted acid; and hence if injected into a vein, causes death. A poisonous dose of the strong acid may be counteracted by chalk or carbonate of soda.

PHOSPHORUS. This elementary, solid, non-metallic body was discovered in 1669, by Brandt, an alchymist of Hamburg; he kept the mode of preparation for a long time secret, but as he could not conceal the fact of its being obtained from urine, Kunkel tried to procure it from the same source, and he succeeded in the attempt.

It will not be requisite to describe the original mode of preparing this very peculiar substance, and we shall give an outline merely of the method at present employed. It has been shown that animal bone [Bone] contains a large quantity of phosphoric acid combined with lime, forming a subsesqui-phosphate of that earth; and it was first proposed by Scheele to obtain phosphorus from bone; for this purpose the bones are ignited or calcined in contact with the air till they become white; and when this happens it is a proof that the charcoal derived from the decomposition of the animal matter is entirely expelled. In this state they consist of phosphate of lime mixed with little else than a small portion of carbonate of lime. After being reduced to a fine powder, they are digested for a day or two with sufficient water to form a thin paste, and half their weight of sulphuric acid. In this case sulphate of lime is formed, and the greater part of it remains insoluble, and a superphosphate of lime remains in solution; this is to be evaporated in a copper vessel, and the precipitate formed being separated, the clear fluid, which is chiefly phosphoric acid, is to be evaporated nearly to dryness, and mixed with about a fourth of its weight of powdered charcoal; this mixture is to be strongly heated in an earthen retort, the beak of which is immersed in water; by the action of the heat the phosphoric acid yields oxygen to the carbon, and the results are carbonic acid or oxide, which is evolved in the gaseous state, and the vapour of phosphorus, which is condensed by passing into water.

The properties of phosphorus are, that it is solid, translucent, and nearly colourless; but sometimes it has a yellow or reddish tint; it is so soft that it may be indented by the nail, and it is very readily cut. When heated to about 108° it fuses, and at 550° it is converted into vapour; it has a peculiar smell when exposed to the air, but this is probably derived from the action of the oxygen of the air upon it. Neither water nor alcohol dissolves phosphorus, but it is dissolved by æther and by oils. It emits light when exposed to the air in the dark, and hence its name (from φῶς, *light*, and φέρειν, *to carry*). It is extremely inflammable, and has been known to take fire spontaneously in the atmosphere when its temperature was not above 60°. Its specific gravity is about 1·77. Phosphorus is also soluble by the aid of heat in naphtha, sulphuret of carbon, and sulphuret of phosphorus, and on cooling from solution in the last-mentioned it has been obtained in dodecahedral crystals; and by mere fusion and slow cooling of a larger quantity, it has been procured in octohedral crystals.

Oxygen and Phosphorus combine with great readiness, and form several different compounds. We shall first describe the

Oxide of Phosphorus.—This is prepared by melting phosphorus in hot water, and in this state forcing a jet of oxygen gas upon it. The phosphorus burns under water, and the results are phosphoric acid, which remains in solution, and which we shall presently describe, and a red pulverulent body, which remains at the bottom of the vessel, and is the oxide of phosphorus. Its properties are, that it is inodorous and tasteless, and is insoluble in water, alcohol, æther, or oil. It undergoes no change in the air, even when heated to above 600° Fahr.; but at a low red heat it burns. In chlorine gas it inflames. It decomposes nitric acid readily, and combining with its oxygen, it becomes phosphoric acid. It does not possess either acid or alkaline properties.

It is composed of—

One equivalent of oxygen . .	8
Three equivalents of phosphorus .	48
Equivalent .	56

Hypophosphorous Acid was discovered in 1816 by M. Dulong. When phosphuret of barium is acted upon by water, both suffer decomposition, and there are formed phosphuretted hydrogen, phosphoric acid, hypophosphorous acid, and barytes; this earth combines with both these acids, and the phosphate of barytes, being insoluble, is precipitated, while the hypophosphite is soluble, and sulphuric acid being added to the solution, sulphate of barytes is precipitated, and free hypophosphorous acid remains in solution; by evaporating this, a viscid strongly acid substance is obtained, which is hydrated hypophosphorous acid.

The properties of hypophosphorous acid are, that it is liquid, uncrystallizable, has a powerful taste, is heavier than water, and cannot be obtained in a dry state. When subjected to the action of heat, it is quickly decomposed into phosphuretted hydrogen gas, which escapes, and phosphorous and phosphoric acids. Water dissolves this acid in all proportions; it acts very powerfully as a deoxidizing agent, taking oxygen from many compounds containing it: it nevertheless combines with many salifiable bases, forming salts which are termed *hypophosphites;* these salts are remarkably soluble in water; they are usually deliquescent, and crystallize with great difficulty.

Hypophosphorous acid is composed of

One equivalent of oxygen .	8
Two equivalents of phosphorus	32
Equivalent .	40

Phosphorous Acid, like the preceding, is entirely an artificial product; it is obtained in the greatest purity by subliming phosphorus through bichloride of mercury in a glass tube. During the action of the heat, the phosphorus takes half the chlorine from the mercury, and they form a volatile compound which condenses into a limpid liquid. When this chloride of phosphorus is mixed with water, mutual decomposition occurs; the hydrogen of the water and the chlorine of the chloride form hydrochloric acid, while the oxygen and phosphorus unite to form phosphorous acid. By evaporation the hydrochloric acid is expelled, and when it has been continued until the residue, while hot, has the consistence of a syrup, it becomes a solid crystalline mass on cooling, which is hydrated phosphoric acid. This acid dissolves very readily in water; it has a sour taste, reddens vegetable blue colours, and combines with some bases to form salts, which are called *phosphites.*

Phosphorous acid is also formed when phosphorus is burnt in rarefied air. When phosphorus is exposed to air and moisture, it has been long known that a dense sour fluid is formed by the aborption of oxygen: this was supposed by M. Dulong to be a peculiar acid, and he called it phosphatic acid; it was however subsequently shown by Davy to be mixture of phosphorous and phosphoric acids.

Phosphorous acid appears to be composed of

One and a half equivalents of oxygen	12
One equivalent of phosphorus .	16
Equivalent . .	28

Phosphite of Ammonia is procured by adding carbonate of ammonia to the acid to saturation. It crystallizes in deliquescent needles; when heated, it is decomposed, giving out ammonia, and by the continued application of heat the phosphorous acid remaining is converted into phosphoric acid. It is not a salt of any importance.

Phosphoric Acid.—This acid exists largely in nature, not only, as has been already mentioned, in combination with lime, forming bone, but also in some vegetable products, and often in the bowels of the earth, combined with lime, forming a mineral which, when crystallized, is frequently called *apatite.* It also occurs in combination with oxide of iron, copper, lead, manganese, and uranium; but the quantity of these compounds is by no means large, and they are regarded chiefly as objects of curiosity.

Phosphoric Acid may be artificially formed by the direct combination of its elements. When a piece is inflamed, and it is immediately covered by a large bell glass, the phosphorus is converted into white flakes of phosphoric acid, which fall like snow in the vessel. When exposed for a short time to the air, the acid deliquesces, and so great is its affinity for water, that when the solid acid is collected, and a little water is added to it, it is converted into a hydrate with explosive ebullition, owing to the heat which is evolved during combination. Phosphoric acid, when free from water, is exceedingly fixed in the fire, but when the hydrate is heated it is dissipated.

Phosphoric acid is also formed when phosphorus is heated in moderately strong nitric acid; the nitric acid is decomposed, and yields oxygen to form the phosphoric acid. By evaporation in a platina capsule hydrated phosphoric acid is obtained.

Phosphoric acid is composed of

Two and a half equivalents of oxygen	20
One equivalent of phosphorus .	16
Equivalent . .	36

Phosphoric acid is colourless, inodorous, dense, extremely sour to the taste, and acts strongly on vegetable blue colours; it does not however, like sulphuric acid, destroy the skin when applied to it. According to Professor Graham, phosphoric acid is peculiarly disposed to combine with different proportions of water, and these compounds exhibit properties so different, that they might be supposed to be three different acids, instead of different hydrates of the same acid. When the dry acid, obtained as described from the combustion of phosphorus, is thrown into water, a mixture of the three hydrates is obtained in variable proportions, but they may be separately obtained [illegible] a pure state from the common phosphate of soda of the shops; after it has been purified by solution and re-crystallization. Decompose a warm solution of this salt by means of a solution of acetate of lead, and wash the precipitated phosphate of lead, and then pass a current of hydrosulphuric acid through it while suspended in water. When the excess of hydrosulphuric acid has been expelled by heat, a very sour fluid remains, which, according to Professor Graham, is a terhydrate of phosphoric acid; but following the practice of some other chemists, we have reckoned the equivalent of phosphorus at only half the weight which he has done, and consequently this hydrate we regard as a sesquihydrate, composed of

One and a half equivalents of water	13·5
One equivalent of phosphoric acid	36
Equivalent	49·5

This acid is unalterable by boiling its solution or keeping it for any length of time. The class of salts which this hydrate forms are the old or common phosphates, which give a yellow precipitate with nitrate of silver. Common phosphate of soda contains therefore this sesquihydrated phosphoric acid.

Pyrophosphoric Acid. — Professor Clark of Aberdeen first discovered that when common phosphate of soda is heated to redness, it is completely changed in some of its properties, and after being dissolved in water, it affords crystals of a new salt, which he named pyrophosphate of soda. It gives a white precipitate with nitrate of silver, instead of a yellow one. If a solution of this salt be decomposed by one of acetate of lead, and the precipitated phosphate of lead be treated with hydrosulphuric acid as already described, and the excess of it be suffered to escape by exposure to the air, without the application of heat, the remaining solution is hydrophosphoric acid, consisting of

One equivalent of water	9
One equivalent of phosphoric acid	36
Equivalent	45

When saturated with soda, the pyrophosphate is obtained without the further agency of heat. Unlike the sesquihydrate above described, this acid, if exposed for some time to a high temperature, undergoes a change, it being in fact converted into sesquihydrate.

Metaphosphoric Acid.—If biphosphate of soda be heated to redness, a salt is formed which, treated as the last, gives an acid liquor, containing the metaphosphoric acid or dihydrated phosphoric acid.

Glacial phosphoric acid is also in general mostly metaphosphoric acid. This hydrate is characterised by producing a white precipitate in solution of albumen, and in solutions of the salts of earth and metallic oxides; precipitates which are remarkable semifluid bodies, or soft solids without crystallization.

Hydrogen and Phosphorus combine, and in different proportions. According to Magnus, phosphuret of potassium is obtained when these elements are fused together under water; and when this compound is thrown into water, a yellow powder precipitates, which is a solid phosphuret of hydrogen, containing less hydrogen than

Phosphuretted Hydrogen Gas.—This gas was obtained by Gengembre in 1783: it is procured by boiling phosphorus in a solution of potash. The gas which arises is spontaneously inflammable; and during its combustion there are formed water and phosphoric acid: it is colourless, and has a disagreeable odour resembling that of onions. Water dissolves about two per cent. of this gas; but the solution, unlike that of sulphuretted hydrogen gas, has no acid properties. It suffers no change of composition, whether kept in the dark or exposed to light. The specific gravity of this gas, according to Dumas, is 1·761. It is stated that its spontaneously inflammable property is lost by being kept over water: this power, according to Prof. Graham, must depend upon something extraneous; this is shown by the circumstance that the gas which is obtained by heating hydrated phosphorous acid, and which Davy called hydrophosphoric gas, is not spontaneously combustible. It has been further shown by Prof. Graham that the gas is deprived of its power by porous absorbents, such as charcoal, by phosphoric acid, and by a most minute quantity of several combustible bodies, such as potassium, the vapour of æther, and essential oils; and he also discovered that the property was communicated to the gas obtained by either process, by the addition of a very minute quantity of nitric oxide gas, or of nitrous acid, varying from 1-1000th to 1-10,000th of the volume of the gas.

Phosphuretted hydrogen gas decomposes some metallic solutions, such as those of copper and mercury, and metallic phosphurets are precipitated; and when it is pure, it is entirely absorbed by sulphate of copper and chloride of lime.

It is probably composed of—

One and a half equivalents of hydrogen	1·5
One equivalent of phosphorus	16·
Equivalent	17·5

Chlorine and Phosphorus combine in two proportions, forming the protochloride and perchloride.

Protochloride or *Sesquichloride of Phosphorus.*—When a mixture of bichloride of mercury and phosphorus is heated, we have already had occasion to notice that protochloride of phosphorus is produced. When first procured it has generally a reddish colour, owing to the presence of a little uncombined phosphorus. When this has had time to deposit, or when it is purified by slow distillation, it becomes limpid and colourless. It has a suffocating odour, and exhales and fumes when exposed to the air. Its specific gravity is 1·45. It does not alter the colour of dry litmus paper, but if moist, then hydrochloric and phosphorous acids are formed, which redden it strongly. The vapour of this compound is combustible, and acts with great energy upon water, producing the changes which have been described.

It is composed of

One and a half equivalents of chlorine	54
One equivalent of phosphorus	16
Equivalent	70

Perchloride of Phosphorus is obtained by the spontaneous combustion of phosphorus in chlorine gas; a white, flaky, volatile compound is formed, which is the perchloride. It is volatile, rising in vapour at 200°. It is fusible under pressure, and crystallizes in prisms. It reddens dry litmus paper, owing, as has been suspected, to its acquiring oxygen and hydrogen from the decomposition of the paper. Like the protochloride, it acts strongly upon and decomposes water, but the results are phosphoric instead of phosphorous acid, and hydrochloric acid.

It is composed of

Two and a half equivalents of chlorine	90
One equivalent of phosphorus	16
Equivalent	106

Azote and Phosphorus form phosphuret of azote. This compound cannot be obtained by direct action; it is the result of the action of ammonia on the chlorides of phosphorus. The changes which occur are effected with difficulty, but the phosphuret of azote eventually obtained has the following properties: it is a light white powder, and although formed of very volatile constituents, it remains fixed and infusible even at a red heat, when the access of air is prevented; but if that be present, white vapours of phosphoric acid are formed. This compound of azote is remarkable also for its indifference even to the most powerful reagents; it is insoluble in water and in acids, nitric acid even attacking it only after long continued exposure to it. Chlorine and sulphur do not act upon it; it is insoluble in alkaline solutions, but when heated with solid hydrate of potash, ammonia is evolved. It is composed of

One equivalent of azote	14
One equivalent of phosphorus	16
Equivalent	30

Sulphur and Phosphorus may be made to combine by fusion in an exhausted flask or under water, but the operation requires great caution. Mr. Faraday melted seven parts of phosphorus with five parts of sulphur; a reddish-brown liquid was obtained, which was rendered of a light yellow and semitransparent by agitation in solution of ammonia.

This compound remained fluid even when cooled down to 20°, and was perfectly liquid at 32°. After being kept for some weeks in a bottle of water, crystals were deposited which were sulphur, and at the temperature of 40° it became a crystalline mass; the relative proportions of sulphur and phosphorus appeared to be four and eight, and it was therefore probably a bisulphuret, consisting of—

Two equivalents of sulphur	32
One equivalent of phosphorus	16
Equivalent	48

Bromine and Phosphorus combine when brought into contact in a flask filled with carbonic acid gas: heat and light are evolved, and two bromides are formed; one is solid, crystalline, and collects in the upper part of the flask, and the other is fluid, and remains at the bottom.

The liquid compound is probably a protobromide, composed of single equivalents of its elements; this remains liquid at 52° Fahr. When heated it is readily converted into vapour, and on exposure to the air it emits penetrating fumes. It reddens litmus slightly, an effect which is probably derived from the moisture which it contains. When only a small quantity of water is added to this compound, heat is excited by their action, and hydrobromic acid is evolved; in a large quantity of water, the gas is dissolved. The perbromide, while it remains solid, is yellow; but by heat it first melts into a red-coloured liquid, and is afterwards converted into a vapour of the same colour; by fusing it yields rhombic crystals, but by sublimation they are acicular. When exposed to the air, it emits dense penetrating fumes; and on the addition of water to it, it is converted into hydrobromic and phosphoric acids.

Iodine and Phosphorus.—When these substances, perfectly dry, are heated together in an exhausted vessel, they act violently, giving out heat, unaccompanied by light. When the proportions are one of phosphorus and about twelve of iodine, the compound is reddish-brown, very fusible, and is probably a sesqui-iodide of phosphorus. It is decomposed by water, and resolved into hydriodic and phosphorous acids.

When the proportions are one of phosphorus and about forty of iodine, a black and less fusible compound is formed, which is resolved by water into hydriodic and phosphoric acids: it is probably composed of two and a half equivalents of iodine and one of phosphorus.

Selenium and Phosphorus may be made to combine by dropping the selenium into the melted phosphorus. It is an unimportant compound, and is probably a di-seleniuret.

Phosphorus may be made to combine with the greater number of the metals; the most important of these compounds will be found under each particular metal.

PHO'SPHORUS, MEDICAL PROPERTIES OF. This elementary substance exists as an essential constituent both of vegetable and animal bodies; yet when applied in a concentrated and pure state to any organised structure, it acts upon it as a violent and corrosive poison. Into animal bodies it is introduced in a diluted and combined state, by which it is disarmed of its virulence, as an ingredient of many common articles of food. One of the chief sources of it is the starch of the cereal grains, such as wheat-flour, in the ashes of which, when burnt, it amounts to 23 per cent. (Prout's *Bridgewater Treatise*, book iii.); also alliaceous plants, such as onions, in which it exists as a phosphate of iron; polygonous and other plants, in which it occurs as a phosphate of lime. It also exists not only in the bones and other hard parts of animals, but in many of the fluids, especially the excretions. Thus it is found in the milts and roes of fishes, the substance of oysters, the yelk of eggs, in the liver, and also the brain, in which organ of the human being it amounts to from 2 to 2½ per cent.

Phosphorus is of all stimulants the most powerful and diffusible, but, on account of its activity, highly dangerous. Its poisonous action seems to be connected with its strong affinity for oxygen, by which it is converted into phosphorous and phosphoric acids. Hence when brought in contact with the animal tissues, it abstracts oxygen from them, and produces an eschar, resembling a burn: the phosphorus in this way loses weight and is absorbed, so that the exhalation from the lungs and the cutaneous perspiration are impregnated with the vapour, and, under certain circumstances, luminous. A very small quantity of solid phosphorus, even one grain and a half, has proved fatal. Solutions of phosphorus in oils, fixed or volatile, or in æthers, are still more active and dangerous.

Little use is made of phosphorus or its oleaginous solutions in medical practice in Great Britain, though in cases of extreme prostration of the nervous system it is not without its value.

In the event of a poisonous dose being taken, bland mucilaginous fluids should be freely administered, followed by magnesia or chalk.

PHO'TIUS was born in the early part of the ninth century, of a patrician family of Constantinople. He studied in that city, and attained great proficiency in all kinds of learning, which was enhanced by an irreproachable morality. He was noticed by the emperor Michael III., who employed him in various important offices. The emperor sent him on a mission to Assyria (probably Persia is meant), and on his return made him proto-spatharius, or commander of the guards, and proto-secretarius and member of the emperor's privy council. Bardas, the uncle and colleague of Michael, was very partial to Photius; and having, on account of some dispute as to jurisdiction, removed and banished the patriarch Ignatius, he determined to put Photius in his place. Photius, being a layman, took all the various clerical orders one after the other in six consecutive days; and after being ordained priest, he was installed in the patriarchal chair, A.D. 853. But the informality of his appointment was too glaring, especially as Ignatius, although threatened and imprisoned in order to force him to abdicate, refused to do so. A subservient council was assembled at Constantinople, A.D. 858, which deposed Ignatius and confirmed the appointment of Photius. Photius sent two bishops to Rome with letters for Pope Nicholas I., in which he gave a specious account of his election, and invited the pope to send legates to Constantinople, in order to co-operate with him in putting down the remains of the Iconoclastic heresy. The legates came; and a new council being assembled, A.D. 859, which the legates attended, Ignatius was brought before it, and was again deposed on the score of incapacity and other charges, and obliged to sign his own abdication, with the concurrence of the papal legates, who were either deceived, or bribed, or frightened into compliance by the party of Photius.

The see of Rome had for more than a century past been disputing with that of Constantinople on a question of jurisdiction. During the period of the superiority of the Iconoclasts at the court of Constantinople, the patriarchs of that city, supported by the emperors, had appropriated to themselves the spiritual jurisdiction over the extensive provinces of Illyricum, Macedonia, Achaia, and Sicily, which had formerly been subject to the Roman see. A fresh subject of contention afterwards served to embitter the quarrel. The heathen inhabitants of Bulgaria being converted to Christianity by both Latin and Greek missionaries, Photius placed the new churches of Bulgaria under his own jurisdiction, a measure which seemed justified by the proximity of Bulgaria to Constantinople. But the pope alleged that his own missionaries had been first in the field, and that the king or chief of Bulgaria had sent his own son to Rome, which was a sort of acknowledgment of spiritual obedience. In short Nicholas demanded the restitution of the provinces of Illyricum, Macedonia, Achaia, Sicily, and Bulgaria, which Photius stoutly refusing, the pope assembled a council at Rome, A.D. 862, in which he pronounced the election of Photius to be illegal, and excommunicated him with all his abettors. Photius however remained quietly in his see; and in the year 866, having assembled a council at Constantinople, he produced five charges, some relating to doctrine, and others to discipline, against the Roman or Western Church. The charges were proved; and Photius, at the head of his council, excommunicated the pope, and declared him and his abettors to be removed from the communion of orthodox Christians: the charges were:—1, that the Romans fasted on the Sabbath, or seventh day; 2, that they allowed the use of milk and cheese during the first week in Lent; 3, that they forced celibacy on the clergy, the consequence of which, observed Photius, was, that their country swarmed with bastards; 4, that their bishops alone anointed persons with the holy chrism, withholding that power from presbyters; 5, that they had interpolated the Nicene creed on the subject of the Holy Ghost, by adding the word 'filioque,' thus asserting the Holy Ghost to proceed from the Son as well as from the Father, 'a tenet unknown till the fifth or sixth century, and even then only partially admitted by some of the Western churches.' (Photius, *Epistles.*)

In the year 867, after the murder of the emperor Michael, Basilius the Macedonian ascended the throne. It is said by some that Photius refused him the sacrament, and reproached him with the murder of his benefactor. However this may be, Basilius soon after deposed Photius, exiled him to Cyprus, and restored Ignatius to his see; and this act was confirmed by a general council assembled at Constantinople, A.D. 869, which was attended by legates of Pope Adrian II., and in which Photius was condemned. This is called the eighth Œcumenical council, having been acknowledged by both the Eastern and Western churches.

Photius in his exile found means to deprecate the hostility of the emperor, and after some years he was allowed to return to Constantinople. He is said to have composed a genealogy of Basilius, in which he made him descend from Tiridates, king of Armenia. At the end of the year 877, the patriarch Ignatius died; and the canonical impediment to the exaltation of Photius no longer existing, he was replaced on the patriarchal see; and Pope John VIII. was induced to approve his nomination, with the view of restoring peace to the church. In 879 Photius assembled a new council at Constantinople, in which the word 'filioque' was erased from the creed. The separation however between the two churches was not finally consummated till nearly two centuries later, when the patriarch Michael Cerularius, after a long and angry correspondence with Leo IX., was excommunicated, with all his adherents, by the pope's legates, who solemnly deposited the written act of excommunication on the grand-altar of Sancta Sophia, and having shaken off the dust from their feet, departed from Constantinople, A.D. 1054.

In the year 886, Leo, the son and successor of Basilius, exiled Photius, for reasons not clearly ascertained, into Armenia, where the patriarch died some years after; but the epoch of his death is not exactly known. Photius was of an ambitious and turbulent disposition, and this was his chief failing. Much has been written for and against him; the Greek and Protestant writers being mostly in his favour, and the Roman Catholics against him. All however agree in admitting his very extensive learning, which was truly wonderful for his age, as well as his exquisite critical judgment.

The following are his principal works:—1, 'Myriobiblon, sive Bibliotheca librorum quos legit et censuit Photius,' with a Latin translation, fol., 1653. Imm. Bekker published the Greek text, corrected after a Venetian and three Paris MSS., with an index, Berlin, 1824, 2 vols. 4to. The Bibliotheca is a kind of review of the works which he had read, many of which have been since lost. Photius gives a brief epitome of each, adding his own critical judgment of the merits of the writer, and of his statements and opinions. In this manner Photius reviews more than fifty historians, a still greater number of divines, besides orators, philosophers, grammarians, rhetoricians, &c., in all 279 works which he had read and examined. Fabricius (*Biblioth. Græca*, v. 35) gives an accurate list of the works noticed by Photius. 2, a Greek Lexicon, published by Hermann, 4to. Leipzig, 1808: another edition by Porson appeared after his death, under the superintendence of Dobree, London, 1822; it is entitled Φωτίου τοῦ Πατριάρχου λέξεων συναγωγή. E. Cod. Galeano, descripsit R. Porsonus, 2 vols. 8vo. 3, 'Epistles,' fol., London, 1651. 4, 'Nomocanon, being a Collection of the Acts of the Councils, to the Seventh Œcumenical, with the corresponding decrees of the Emperors concerning Ecclesiastical Matters,' Basle, 1652. 5, A treatise, 'Adversus Latinos de Processione Spiritus Sancti,' and other theological and controversial works, several of which are still unpublished: among others, one against the Paulicians, of which Montfaucon gives some fragments in his 'Bibliotheca Cosliniana.' 6, 'Amphilochia, being Answers to Questions relative to various Passages in the Scriptures, with an Exposition of the Epistles of St. Paul.'

PHOTOGENIC DRAWINGS, facsimile representations of objects produced according to the recent discovery of M. Daguerre, mechanically by the chemical action of light on a prepared metallic tablet, upon which the images of the objects are thrown by a camera-obscura. Such apparatus is named after its inventor the Daguerrotype, and the process itself either photogeny, photography, or heliography (sun-drawing). The invention was first formally communicated to the public by M. Arago, who read an account of the Daguerrotype before the Academy of Sciences, January 7th, 1839. From that moment Daguerre (who was afterwards rewarded by a pension by the government) and his invention engrossed general attention. The discovery was spoken of as little short of miraculous; and as having realised what had long been considered a hopeless desideratum, namely, the giving permanency to the beautiful pictures produced by the camera-obscura, with the exception indeed of colour and motion, on both of which, the latter quite as much as the first, the peculiar charm of the camera-obscura depends; whereas the slightest degree of motion, even that of clouds and trees, is positively injurious to the action of the Daguerrotype, producing indistinctness of form, and blurring those parts of the picture which are affected by the motion. Hence not only powerful sunshine, but perfect stillness in the atmosphere is required for its successful operation, and its practical usefulness becomes limited to the delineation of buildings, sculptures, and other inanimate objects, more especially such as are independent of sunshine, and which may at any time be copied by means of a sufficiently strong artificial light thrown upon them.

Still, though, even after the great improvements since made in it, the powers of the Daguerrotype are so far circumscribed, the invention is highly valuable, because it not only ensures perfect fidelity of likeness where it is most essential, and where it is hardly attainable by the most practised and patient hand and eye, but also gives us the minutest details—those which are imperceptible to the naked eye, and of course cannot possibly be represented upon paper, yet become visible in a photogenic drawing when it is examined with a magnifying-glass. If therefore the Daguerrotype should be found susceptible of no further improvements, it will still be an invention of the greatest utility to art, since by means of it facsimiles of the most beautiful and valuable works, of the finest buildings and statues, of the most elaborate carvings and designs, furniture, &c., may be obtained with great expedition. Nevertheless, now that the first novelty has worn off, the interest taken by the public in the discovery has greatly diminished. This is easily accounted for, since besides that the class of objects for which it peculiarly recommends itself are not appreciated by the many, there certainly are defects and inconveniences attending photogenic drawings: the principal one is, that they must be upon metallic tablets with a highly polished surface; consequently their appearance is not that of a print or drawing, but of an engraved steel plate, devoid of any general effect as to light and shade, and producing a glare offensive to the eye, in order to avoid which it is necessary to hold the tablet in a particular direction. The metallic tablets render them expensive, and their material and fitting-up (as each plate is fixed upon a pannel, and protected by a glass over it) makes it difficult to keep any number of them, except in cabinets with shallow drawers for the purpose. Neither can they be hung up in frames, since in addition to their appearing only like so many polished plates of metal, it would be necessary to take them down whenever it was required to look at them.

More recently M. Bayard has found out a method of taking similar delineations by means of the camera-obscura upon paper, which, besides having the advantage of being much cheaper, and capable of being kept like prints, are said to be far more pleasing to the eye, and in fact to have nearly the effect of sepia drawings. But on the other hand they fall infinitely short of metallic photogenic drawings; for not only is the outline of objects less distinct, but no more can be shown than what appears to the naked eye, no further details being rendered visible by the use of a convex lens. This invention is however at present quite in its infancy, and may possibly receive great improvements, although it is not at all likely that it will ever be able to accomplish what is the most wonderful and valuable characteristic of the Daguerrotype drawings, namely the delineation of objects as they really exist, with all those minutiæ which are invisible to the naked eye.

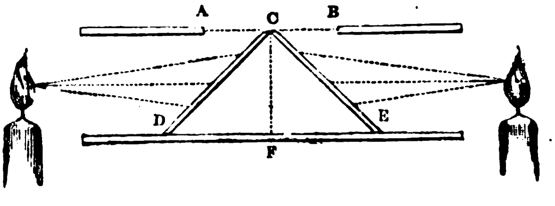
Photogenic drawings are produced upon plates of copper coated over with silver, which are found to answer better than such as are entirely of the last-mentioned metal. After being washed with a solution of nitric acid, the plate is put into a well-closed box, where it is exposed to the action of iodine, a small quantity of the latter being placed at the bottom of the box with a thin gauze between it and the plate. A layer of ioduret of silver is thus formed on the surface of the plate, and manifests itself by the yellow hue produced on the silver, which shows that the process of giving the plate the sensitive coating on which the action of light delineates objects is completed. Thus prepared, the plate is next placed within a camera-obscura of particular construction, and the delineation of the object is then effected in a very short space of time, but has to be afterwards brought out and rendered distinct by another operation, namely submitting the plate to the action of vapour of mercury. Even then the process is not completed, for the plate has to be plunged into a solution of hyposulphite of soda, and afterwards washed in distilled water, which being done, the impression is fixed, and the plate may be exposed to light with perfect safety. For further details and instructions relative to these different operations, the reader may consult the 'Handbook of Heliography,' London, 1840. But as yet the art is only in its infancy, and yery great improvements in it may be looked forward to.

PHOTO'METER (literally 'light-measurer,' from φῶς and μέτρον), the name given to instruments constructed for the purpose of measuring the relative illuminating powers of different sources of light. When light or heat falls upon any substance, it is disposed of either by reflection, absorption, or transmission, or else by two of them, or all three of them combined. If two substances could be found which would reflect, absorb, and transmit calorific rays with the same intensity, and likewise reflect luminous rays equally, but differ in their powers of absorbing and transmitting light, we should then possess the means of at least ascertaining whether the absorption of light alone will produce effects analogous to what is observed to follow the absorption of caloric. For this purpose it would be only necessary to prepare a differential thermometer whose bulbs were of the substances possessing the properties alluded to. The calorific rays accompanying the incident light would, by acting equally upon the two bulbs, produce no change in the indications of the instrument, and the only alteration, if any, which could ensue, would arise from the unequal absorption of light by the two bulbs. This alteration however, when observed, though it might be considered a correct measure of the quantity absorbed, could not be taken for a measure of the quantity or brightness of the incident light, unless it could be further shown that the quantity absorbed by the same substance is proportional to the quantity of incident light, whatever may be its nature, that is, whether it be solar light, gas light, &c.

The photometer invented by Leslie differs from the instrument we have supposed merely in its being in some respects less deserving of the name. It consists of a differential thermometer having one of its bulbs of plain transparent glass, the other of the same material coated either with Indian-ink or black enamel, and is described by its author in the article 'Meteorology' in the *Encyclopædia Britannica*, wherein he observes,—'The rays which fall on the clear ball pass through it without suffering obstruction; but those which strike the dark ball are stopped and absorbed at its surface, where, assuming a latent form, they act as heat. This heat will continue to accumulate till its further increase comes to be counterbalanced by an opposite dispersion, caused by the rise of temperature which the ball has come to acquire. At the point of equilibrium therefore the constant accessions of heat derived from the action of the incident light are exactly equalled by the corresponding portions of it again abstracted in the subsequent process of cooling. But in still air the rate of cooling is, within moderate limits, proportional to the excess of the temperature of the heated surface above that of the surrounding medium. Hence the space through which the coloured liquid sinks in the stem will measure the momentary impressions of light, or its actual intensity.' Allowing that the light incident upon the clear ball is wholly transmitted, and that that which strikes the dark ball is wholly absorbed, assumes a latent form, and then acts as heat, it by no means follows that the effect produced upon the instrument was wholly or even chiefly attributable to the absorption of light, since we learn from Leslie's own experiments (*Heat*, p. 87) that the calorific rays which accompany the incident light would be more abundantly absorbed by the dark than by the light ball. This has since been so satisfactorily established by the observations of Thomson and others, that, as a measurer of light, the instrument may be regarded as useless.

The defects of Leslie's photometer were to a considerable extent obviated by Mr. Ritchie, the late professor of natural philosophy in the London University College, and then rector of the academy of Tain, who, in 1825, communicated to the Royal Society the description of a new photometer. In order to intercept the calorific rays accompanying the light experimented upon, he transmitted the latter through a thick circular disk of glass into a metallic air-light cylinder, the diameter of which was considerable compared with its depth. The axis of the cylinder was placed horizontally, and the aperture covered by the glass was the only one through which the light was admitted. Across the interior of the cylinder was stretched a circular sheet of dark paper, which absorbed the transmitted light, and, as was supposed, thereby converted it into heat, which became sensible by its expanding the air within the cylinder. A second cylinder of the same form and construction was placed by the side of the first so that the line of axes might coincide, but with the aperture for the admission of light turned in the contrary direction, and in that position they were connected by a bent thermometer tube containing a coloured fluid, which served to prevent the air of one cylinder mixing with that of the other. So long as the air in the two cylinders possessed the same degree of elasticity, the level of the fluid in the two branches of the tube was of course the same; and a variation of level indicated a variation in the elasticity of the two bulks of air, arising from the more energetic action of the medium admitted through one aperture than through the other. To compare the relative intensities of two lights, the instrument was placed anywhere between them, and approached towards one or the other, until it was found that the position of the fluid in the tube was the same as when the instrument was not under the influence of the lights. Supposing the whole of the calorific rays and none of the luminous rays to have been intercepted by the glass, this position determined the point at which the intensity of the two lights was the same; and hence, since the intensity of light varies inversely as the square of the distance from its source [LIGHT, p. 472], it followed that at equal distances from their respective sources their intensities were directly proportional to the squares of their observed distances from the instrument.

More recently the same gentleman constructed a very simple instrument which affords an almost unerring measure of the relative brightness of two lights, provided they are of the same colour. The principle originated with Bouguer, who published it in his 'Traité d'Optique,' in 1760. The annexed figure represents a vertical section of the instrument. It consists of a rectangular box open at both ends and blackened upon its inner surface. On the top is a long narrow rectangular slip AB, covered with tissue or oiled paper. Within are two sheets of plane looking-glass, CD and CE, cut from the same slip to ensure uniformity of reflexion. Each sheet has the same width as the box, and its length equal to the hypothenuse of a right angled isosceles triangle, whose side is the height of the box. Their reflecting surfaces are turned towards the open ends of the box, and their upper extremities rest against each other along a line, which in the figure is projected into the point C, and which divides the aperture AB into two equal parts, separated by a narrow strip of black card to prevent the mingling of the lights reflected from the two planes. In using the instrument, it is placed between the lights whose intensities are to be compared, so that they may be reflected from CD and CE upon the tissue AB. It is then approached nearer to one or the other until, to an eye situated above AB, the two portions AC and BC appear equally illuminated, which, on account of the immediate proximity of AC and BC, may be determined with tolerable correctness; the colour of the two lights being supposed the same. The distances of the lights from the vertical CF being measured and squared, give the direct ratio of the intensities as before.



It remains to notice a mode of comparing the illuminating powers of two lights suggested by Count Rumford, which is remarkable for the facility with which it may be applied, and the simplicity of the requisite apparatus, nothing more being needed than a smooth surface of small extent and of a light uniform colour, and a blackened stick for throwing a shadow. The surface is illuminated by the two lights experimented upon, which are to be so placed, that when the stick is interposed between them and the surface, the two shadows may be nearly in contact, which will enable the eye to decide whether they are of equal depth, and will at the same time ensure the intercepting of rays equally inclined to the surface. So long as the shadows are of unequal depth, one of the lights must be brought nearer to or retired farther from the surface till an equality of depth is obtained, and then the squares of the perpendicular distances of the lights from the surface give the ratio of their intensities. If an equality between the inclinations of the intercepted rays to the surface cannot be obtained, then, when the two shadows are of the same depth, the intensities of the lights will be directly proportional to the squares of their perpendicular distances from the surface, and inversely proportional to the sines of the inclinations of the intercepted rays to the surface.

The last two methods are theoretically perfect, when applied to lights of the same colour; those which precede, though independent of the colour of the light, rest upon hypotheses which, if not untrue, are unestablished.

(For further information the reader may consult Lambert's *Photometria*; the article 'Light' in the *Encyclopædia Metropolitana*, by Sir John Herschel; *The Edinburgh Philos. Trans.*, x., part 2; *The Transactions of the Royal Society*, 1825; and Brewster's *Journal*, 1825, ii., pp. 321 and 339; iii., p. 105: and 1830, iii., new series, p. 284.)

PHRAA'TES. [Parthia.]

PHRAGMI'TES, or the Reed, is a plant formerly regarded as a species of Arundo, but now separated from that genus on account of its lower floret being male while the others are hermaphrodite, and its rachis being fringed with long silky hairs. It is a tall plant with annual stems and a perennial root, and is found exclusively in places overflowed even during summer. In such situations it occurs all through Europe, and is common in Siberia, Japan, North America, and even New Holland, forming thick coverts, and yielding an abundance of stout durable grass of great value for the purpose of thatching the roofs of buildings. This is undoubtedly the phragmites (φραγμίτης) of the Greeks. A second species is said to grow in Egypt, and a third in the Isle of France; the two latter species are however little known.

PHRAGMO'CERAS, Broderip's name for a genus of camerated shells found hitherto only in a fossil state.

Generic Character.—Animal unknown.

Shell incurved and compressed, more or less conical; septa entire at their edges, crossed externally by the lines of growth; siphuncle near the inner margin; aperture contracted at the middle, its outer extremity produced into a subcylindrical beak.

This genus is distinguished from *Orthoceras* by being curved, and having a nearly marginal siphuncle; and also from all the species of that genus except *O. piriforme*, by the form of the aperture, which further distinguishes it from *Cyrtoceras* of Goldfuss, the aperture of which is round.

Three species, *P. arcuatum*, *P. ventricosum* (*Orthoceratites ventricosus?* Steininger), and *P. compressum*, from the lower Ludlow rock, are figured in Murchison's great work on the Silurian System; where another species, *P. nautileum*, is also figured with a ? as to the genus.

PHRANZA. [Byzantine Historians.]

PHRAORTES. [Media.]

PHRASE, in Music, a succession of sounds either in melody or harmony, expressing an unbroken sense more or less complete, and terminating in a pause (*repos*), *i.e.* a comparatively long note or a rest: thus forming a cadence more or less perfect.

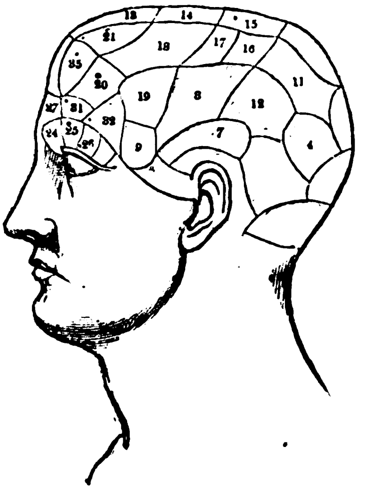
Such is Rousseau's definition of a term concerning which no two writers are agreed, and, in our opinion, a better cannot be given without entering much more at large into the subject than the nature of this work will allow. Those who desire further information on a matter chiefly interesting to composers, may find much in 'An Essay on Music,' by the Rev. W. Jones, F.R.S.; in Riepel's *Anfangsgründe*, &c. (Elements of Musical Composition); in Kollmann *On Harmony*—who uses the word *Period* instead of Phrase; and, above all, in Reicha's *Traité de Mélodie*, 2nd edit., Paris, 1832.

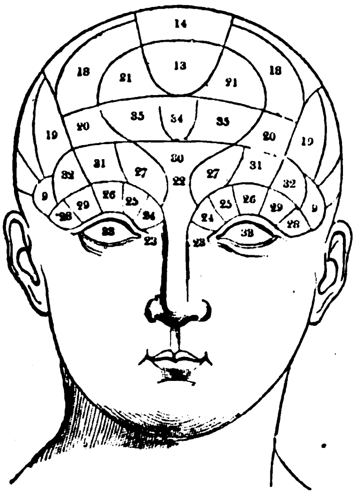
PHRENOLOGY (from φρήν, mind, and λόγος, discourse) is, in the words of Dr. Spurzheim, the doctrine of the special faculties of the mind, and of the relations between their manifestations and the body, particularly the brain. Without entering upon the question of the nature of the mind, or of the number or nature of its original faculties, it may be admitted as the result of all observation, and a fact on which nearly all physiologists are agreed, that the brain is the part of the body by means of which all the powers or faculties of the mind are manifested. The fundamental principles of phrenology, and those in which it chiefly differs from other psychological systems are, that the manifestation of each of the several faculties of the mind depends on a particular part of the brain, and that, *cæteris paribus*, the degree or strength in which each faculty is manifested in each individual, depends on the size of its appropriated portion of the brain, or (as it is termed) its organ.

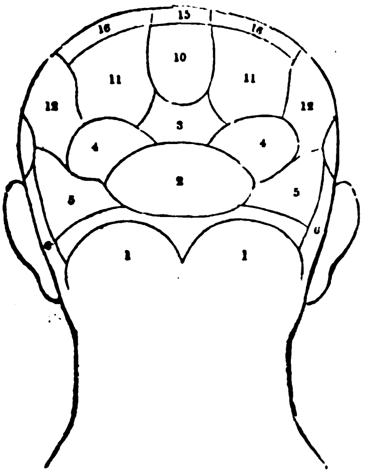
The first principle, that of the plurality of organs in the brain, is supported, 1, by the analogy of the other compound organs or systems in the body, in which each part has its special function; as, for example, in the digestive system, in which the stomach, liver, and other organs perform each their separate share in the common result of digestion of the food; 2, by the different degrees in which, in different individuals, the several mental functions are manifested. Even in the earliest period of childhood, and before education can be imagined to have exercised any influence on the mind, children exhibit the most varied dispositions—each presents some predominant propensity, or evinces a singular aptness in some study or pursuit; and it is a matter of daily observation that every one has his peculiar talent or propensity. But it is difficult to imagine how this could be the case, if the manifestation of each faculty depended on the whole of the brain; different conditions of the whole mass might affect the mind generally, depressing or exalting all its functions in an equal degree, but could not permit one faculty to be strongly and another weakly manifested. 3, The plurality of organs in the brain is supported by the phenomena of some forms of mental derangement. It is not usual for all the mental faculties in an insane person to be equally disordered; it often happens that the strength of some is increased, while that of others is diminished; and in many cases one function only of the mind is deranged, while all the rest are performed in a natural manner. 4, The same opinion is supported by the fact that the several mental faculties are developed to their greatest strength at different periods of life, some being exercised with great energy in childhood, others only in adult age; and that as their energy decreases in old age, there is not a gradual and equal diminution of power in all of them at once, but, on the contrary, a diminution in one or more, while others retain their full strength, or even increase in power. 5, The plurality of cerebral organs appears to be indicated by the phenomena of dreams, in which only a part of the mental faculties are at rest or asleep, while the others are awake, and, it is presumed, are exercised through the medium of the parts of the brain appropriated to them. 6, It is stated that the examination of the brains of individuals, each remarkable for some peculiar propensity or talent, has demonstrated a constant correspondence in the development of a certain portion of the brain; and that thus the results of the observations upon which phrenology was first founded by Dr. Gall, exactly coincide with and confirm the arguments by which its truths may, *à priori*, be made to seem probable. Lastly, pain has sometimes been felt in an organ when the faculty with which it is presumed to be connected has been greatly excited; and when a faculty has been morbidly manifested during life, disease has sometimes been found to have affected the corresponding part of the brain.

The preceding arguments for the existence, in the general mass of the brain, of several organs or instruments for the manifestation of the different powers of the mind, form also the basis of the rules by which those powers which may be called primitive, or original, are determined. Every power of the mind is regarded by phrenologists as a primitive faculty, and is considered to be manifested through the medium of a separate organ, which, 1, exists in one kind of animal and not in another; 2, which varies in the sexes of the same species; 3, which is not proportionate to the other faculties of the same individual; 4, which does not manifest itself simultaneously with the other faculties, that is, which appears or disappears earlier or later than they; 5, which may act or repose singly; 6, which individually is propagated in a distinct manner from parents to children; and 7, which singly may preserve its proper state of health or be affected by disease.

In accordance with these rules Gall enumerated nearly thirty primitive mental faculties, which are admitted, with more or less of modification, by all the phrenologists of the present day; and their number has been augmented by Spurzheim to thirty-five. These faculties Spurzheim divided into moral, or affective, and intellectual. The affective faculties or feelings he again divided into *propensities*, including all those which produce only desires or inclinations, and *sentiments*, including such as not only produce a desire to act, but are combined with some other emotion or affection which is not mere propensity. The intellectual faculties also he divided into the *perceptive* and the *reflective*. The subjoined figures and the references to them will at once indicate this division of the mental faculties, and the situations on the exterior of the head which are supposed to correspond with the portions of the brain belonging to each, according to the system of Dr. Spurzheim. We have also added the figures by which the several organs were marked by Mr. Combe, in the two first editions of his 'System of Phrenology;' in the later editions he has followed the enumeration of Dr. Spurzheim.







Combe.	Spurzheim.	AFFECTIVE. I. *Propensities.*
1.	1.	Amativeness.
2.	2.	Philoprogenitiveness.
3.	3.	Inhabitiveness.
4.	4.	Adhesiveness.
5.	5.	Combativeness.
6.	6.	Destructiveness.
9.	7.	Secretiveness.
8.	8.	Acquisitiveness.
7.	9.	Constructiveness.
		II. *Sentiments.*
10.	10.	Self-Esteem.
11.	11.	Love of Approbation.
12.	12.	Cautiousness.
13.	13.	Benevolence.
14.	14.	Veneration.
18.	15.	Firmness.
17.	16.	Conscientiousness.
15.	17.	Hope.
	18.	Marvellousness.
16.	19.	Ideality.
32.	20.	Mirthfulness or Gayness (Wit).
33.	21.	Imitation.

Combe.	Spurzheim.	INTELLECTUAL. I. *Perceptive.*
19.	22.	Individuality.
20.	23.	Configuration.
21.	24.	Size.
22.	25.	Weight and Resistance.
23.	26.	Colour.
24.	27.	Locality.
27.	28.	Calculation.
25.	29.	Order.
	30.	Eventuality.
26.	31.	Time.
28.	32.	Melody.
29.	33.	Language.
		II. *Reflective.*
30.	34.	Comparison.
31.	35.	Causality.

1. Amativeness is the mental faculty which produces the propensity to physical love, or, as it was termed by Dr. Gall, the instinct of propagation.[*] Its organ is the cerebellum, and its energy is indicated by the extent of the space on each side of the head between the mastoid process, immediately behind the ear and the spine of the occipital bone.

2. Philoprogenitiveness is the faculty which produces the feeling of love towards offspring. The evidence by which this is admitted as a fundamental faculty of the mind may afford an example of the application of the seven rules already given for determining them. There are many animals which take no care of their progeny, as reptiles, and fish, and, among birds, the cuckoo. In many species of animals the females alone take care of their offspring, as among cats, cattle, sheep, &c., and in general, even when both parents protect their young, the attachment of the mother is the stronger. The love of offspring bears no proportion to the other mental faculties, but is shared alike by men and brutes, and among the former is often felt as intensely by the most degraded as by the most exalted of the species. The love of offspring is sometimes, on the contrary, almost completely suppressed. Cases of insanity have not unfrequently occurred in which parental love was lost or greatly diminished; while others are recorded in which the love of offspring has been almost the only feeling which remained unimpaired. The seat of this organ is directly above the middle of that of amativeness; and the energy of the faculty is indicated by the general protuberance of the occipital bone. Though placed in the middle of the head, this organ is of course, like all the others, double, and extends to an equal distance on each side of the median line.

3. *Inhabitiveness.*—The existence of this, the propensity to inhabit particular regions or countries, which produces the love of home, and which determines in each species the dwelling and mode of life which is best adapted to it, is regarded as doubtful. Dr. Gall placed in this situation the organ of pride in man, and that of the instinct in animals which prompts them to seek and inhabit the heights of mountains or to fly high in the air, believing that faculties which are merely physical in brutes may become moral in man, and that there is an analogy between the feelings which prompt to the pursuit of moral and those which excite the desire of physical elevation. Mr. Combe and many of the Edinburgh school of phrenology name this the organ of concentrativeness, believing that it corresponds to the faculty of maintaining two or more powers in simultaneous and combined activity, so that they may be directed towards one object, a faculty disposing to sedentary pursuits, and a close and steady attention, especially by meditation, to a given object. At present it is agreed that the evidence is insufficient for the complete establishment of either of these opinions.

4. Adhesiveness is the propensity to attachment or friendship, by which individuals of the same or different kinds are induced to associate together, and which causes men to be attached to the various objects amongst which they are placed. Its objects are disinterested friendship, marriage, society, and attachment in general. The organ of this faculty is believed to be situated at No. 4, immediately above and to the outer side of that of philoprogenitiveness.

5. Combativeness is the natural disposition which men and animals feel in various degrees to quarrel or fight. In order to discover its organ, Dr. Gall is said to have been in the habit of calling together boys from the streets to endeavour to make them fight. There were of course some who were fond of it, and others who were peaceable and timid: in the former the part of the head marked 5 was prominent; in the latter it was flattened or depressed. The same difference is said to exist in the formation of this part, in correspondence with the strength of this disposition in the

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[*] It may be necessary to mention that the chief modifications introduced into the system of Gall by Spurzheim (whose arrangement is here adopted as being received by the great majority of phrenologists in this country) are expressed in the differences of their terms. Gall designated the organs according to the actions to which he believed their predominance led; Spurzheim according to the nature of the faculties. Thus that which Gall called the organ of murder, Spurzheim named the organ of destructiveness, observing that, though many in whom this organ was greatly developed had committed murder, yet many others, though having a propensity to destruction, had never destroyed human life nor felt any inclination to it. So also Gall's organ of theft is named by Spurzheim the organ of Acquisitiveness, a faculty which gives the propensity to acquire without reference to the means, which, in a man with largely developed conscientiousness, would be honest, but in one without the latter faculty would be theft or fraud of some kind. It will be seen that in Spurzheim's nomenclature the sphere of activity of each faculty, as he terms it, is much more extended than in Gall's. [See further, GALL; SPURZHEIM.]

several species of animals, and remarkably in the different varieties of dogs.

6. Destructiveness, or the propensity to destroy, is the feeling which is gratified by any kind or mode of destruction. Spurzheim ascribed to it the tendency to all kinds of destruction, whatever were their objects, or the mode in which they were effected. Thus defined, the propensity to murder is but one of the directions which the disposition for destruction may take, and one from which in a conscientious and benevolent man it would always be diverted. In such a man this propensity will be exercised for an innocent or even a useful end, as the procuring of food by the slaughter of animals, &c.; in another, in whom its influence is less counterbalanced, there will exist an indifference to the suffering and calamities of others, or even a positive pleasure in beholding or contemplating them; in a third, in whom it is unrestrained, it may break out in acts of violence and love of blood-shedding in every form. In the diseased condition of its organ this propensity is regarded as the source of the irresistible desire for the destruction of life, of which so many lamentable examples are known, and which is commonly called homicidal monomania. The seat of the organ of destructiveness is on each side of the head immediately above the ear, at No. 6; and its various degrees of development may be seen in a comparison of the width at this part of the heads of carnivorous and herbivorous animals.

7. Secretiveness is the propensity to act in a clandestine manner; to conceal emotion, and to be secret in thoughts, words, things, and projects. Its most frequent bad results are cunning and hypocrisy; and the most usual direction which it takes for good ends is prudence. The organ of this propensity is immediately above that of destructiveness, at No. 7. (In the casts made in accordance with the enumeration of the faculties employed by Mr. Combe, in the early editions of his 'System of Phrenology, this organ is marked 9.)

8. Acquisitiveness is the propensity to acquire. Its organ being found very large in notorious thieves, Dr. Gall conceived that there was a natural disposition to theft. Dr. Spurzheim, on the other hand, makes no limitation as to the purpose or mode of acquisition, which he believes to be determined in each case by the degrees in which the several other faculties are developed. Variously modified, the propensity leads in some to the prudent accumulation of property by honest means; in others, to avaricious and purposeless money-making by any method; in others, to theft or fraud. The seat of its organ is at the back part of the temples.

9. Constructiveness is the faculty which leads to construction of all kinds: guided by it birds build their nests, rabbits burrow, beavers make their huts; and men are directed by it to manufactures, the practice of the several branches of the fine arts, building, and various manual operations. Its organ is situated at the lower part of the temple, at 9.

10. Self-esteem is the sentiment which gives an individual a high opinion of himself, which in excess produces pride and arrogance, and when moderate and modified by other superior faculties imparts dignity to the mind, and renders it hostile to everything that is mean or degrading. In a state of derangement the morbid excitement of this faculty leads the insane to imagine themselves exalted to thrones or to divinity. The seat of its organ is at the middle of the upper and back part of the head (10), directly above inhabitiveness (3), with which Dr. Gall (as already mentioned) confounded it.

11. Love of Approbation, according to Dr. Spurzheim, is the sentiment which makes us regard the opinion entertained of us, and induces the question—What will the world or the people say? It is fond of approbation in general, without attending to the manner of acquiring it; and may therefore be directed to objects of the highest importance, as well as to such as are of no moment, or are even hurtful. Ambition is the distinguishing epithet of its agency, if the subject aspired to be of great importance; vanity, if claim be laid to distinction on the score of trifles. The organ is seated on each side of self-esteem; when much developed it generally elongates the upper and back part of the head, but is sometimes spread out laterally so as to widen rather than lengthen it.

12. Cautiousness is the disposition of the mind which leads a man or an animal to take precautions in whatever he has to do; 'it doubts, says *but*, and continually exclaims *take care*' (Spurzheim). When too active it causes irresolution, anxiety, and melancholy. Its organ is situated on the upper lateral and posterior part of the head, between destructiveness and self-esteem.

13. Benevolence is the disposition of the mind from which result compassion, kindness, philanthropy, mildness, charity, and various other amiable social virtues. Its existence as a fundamental power of the mind is considered to be proved by the rules above mentioned, and by which, it may be again observed, the existence of all the preceding and following faculties is determined; the seat of its organ is the upper and middle part of the forehead, just where the hair begins to grow.

14. Veneration. The organ of this faculty was called by Dr. Gall the organ of religion, and he believed that the disposition to the worship of God was directly proportionate to its development. Dr. Spurzheim has here again extended the scope of the faculty, by making it the cause of veneration or respect in general, whether directed to divine or human beings, or to inanimate objects. When the organ of this sentiment is much developed, the head is remarkably elevated, and it was by observing (as Lavater had before done) this peculiarity in the shape of the heads of very pious persons, that the position of the organ on the front part of the top of the middle of the head was determined.

15. Firmness is the faculty which gives constancy and perseverance to the other powers, and contributes to maintain their activity. In its various combinations with other faculties the results to which it leads differ considerably; with much self-esteem and love of approbation it produces an obstinate persistence in the pursuit of honour and rank; with benevolence it excites the most active and persevering philanthropy; with destructiveness and acquisitiveness it may excite to daring acts of murder and rapine. When, on the other hand, this faculty is little developed, it leaves men inconstant, and makes them the mere creatures of circumstances. Its organ is situated at the very top of the head, at 15.

16. Conscientiousness is the fundamental and innate sentiment which disposes mankind to look and to wish for justice. The existence of this feeling in a high degree is one of the chief constituents of a noble mind, and the strongest foundation of morality; its deficiency leaves men with little restraint to prevent them from following the impulses of all their worse propensities, and from striving to attain their ends by the most unworthy means. The situation of the organ of conscientiousness is on the upper part of the head, on each side of that of firmness.

17. Hope is the sentiment which induces men to believe in the possibility of whatever their other faculties desire; it is not mere desire, for that may continue without any hope of being ever gratified. The different degrees in which it is developed will lead one person to be continually building, as it is said, castles in the air, and another to despair of success even in favourable circumstances. It is this sentiment also which inspires the hope of a future state and of immortality. Its organ is situated on each side of that of veneration.

18. Marvellousness is the sentiment which is principally manifested by a belief in miraculous and supernatural circumstances, and which leads men to be amused with everything that can excite their surprise and wonder. Its organ is situated immediately in front of that of hope.

19. Ideality. Dr. Gall regarded the organ of this faculty as the organ of poetry, finding it much developed in all the great poets of antient and modern times. But it is also large in some, who though they may be fond of poetical conceptions, are not poets themselves. Dr. Spurzheim therefore believes that the essential nature of this sentiment is to impress a peculiar character called poetical or ideal, and to vivify the other faculties; to give a sense and love of beauty; to produce sublimity of conception, and excite warmth of imagination and expression. The organ of this sentiment is placed by the side of marvellousness, and the two frequently act together.

20. Mirthfulness or Wit. Spurzheim regards this faculty as affective, not as intellectual, in which view it is considered by Gall, and by the principal phrenologists of the Edinburgh school. He describes it as a sentiment which disposes men to view everything in a gay or joyful manner, and which, according to its various applications in different circumstances, and its modifications by being variously combined with other faculties, produces wit, good humour, caricature, mockery, irony, sarcasms, epigrams, and satires. Its

organ is situated in the upper and lateral part of the forehead, and in the earlier Edinburgh casts is marked 32.

21. Imitation. Those who have this faculty highly developed are fond of acting and of imitating the gestures, voices, manners, and in general all the manifestations of man and animals. It is generally more active in children than in adults: the former always learn a great deal by imitation; of the latter some only employ it much, and these are usually marked by the gestures with which they speak, imitating the habits and manners of whatever forms the subject of their conversation. Its organ is situated at the front of the head, and on each side of benevolence.

22. Individuality is in Spurzheim's arrangement the first of those intellectual faculties which perceive the existence of external objects and their physical qualities. It is the faculty which recognises the existence of individual beings. It is this also which in excess induces men to personify everything of which they speak, whether mere qualities or abstract ideas, or even phenomena, such as motion, life, the passions, &c. Its organ is situated behind the root of the nose, and its greater development enlarges the forehead between the eyebrows.

23. Configuration is the power which takes cognizance of forms and figures generally. One of its peculiar applications, and that by which its organ was first discovered by Dr. Gall, is observed in the power which some individuals possess of remembering the forms and features of different persons; another is shown in the love of portraits, or in the ability to take the likenesses of persons and things. Its organ is situated in the internal angle of the orbit, and when large it pushes the eyeball outwards and downwards, giving the person in whom it is thus developed a somewhat squinting appearance, and making his eyes appear unusually wide apart.

24. Size. This is the faculty which measures the size of bodies, as distinguished from their form, which is appreciated by the preceding power. Its organ is placed at the inner corner of the arch of the eyebrow.

25. Weight. It is believed that the mind estimates the weight and resistance as well as many of the other qualities of bodies, not by the sense of feeling, but by a peculiar internal operation, which must require a special organ. Dr. Spurzheim conjectures that its situation is behind the orbit, in the neighbourhood of configuration and size.

26. Colouring. There appears to be a peculiar faculty for the full appreciation of the relations of colour. For though few are incapable of perceiving the differences of colour in the objects around them, yet all have not the same power in this respect, nor have all the same facility in recollecting or judging of their relations. Many artists who draw well cannot colour; others are good colourists, but cannot imitate or design forms. The organ of this power, which must from these and other similar circumstances be regarded as an original faculty of the mind, is placed in the middle of the arch of the eye-brow.

27. Locality. This is the faculty by which we appreciate and remember the places occupied by objects around us; the mental power which makes the traveller, geographer, and landscape-painter; which recollects localities, and gives notions of perspective. It is remarkably shown in the power which many animals exhibit in tracing their way through great distances in migration, or in returning to their homes; and it gives men the propensity to travel, which many have so remarkably exhibited. Its organ is placed above and on each side of the root of the nose.

28. Calculation might be called the faculty of arithmetic; whatever concerns number or calculation belongs to it, and hence Mr. Combe and many others speak of its organ as that of number. In those in whom the power of calculating is much developed, the external angle of the eye-brow is either much pressed downwards or elevated; the organ of this faculty being situated beneath that part of the brow.

29. Order. It is believed that there is a faculty which gives a disposition to arrange and put things in order; as for example, in a library to place books according to their size and form, in a collection of natural history to make each object occupy its right situation according to its configuration or colour or size. Cleanliness also seems to depend on it, and it produces the pleasure of seeing things complete. Its organ is situated between those of colouring and calculation.

30. Eventuality. Individuals who have this organ large; are attentive to all that happens around them, to phenomena, to events, to facts; they are fond of history and of anecdotes; are inquisitive, and desire information on every branch of natural knowledge. Individuality takes cognizance of things which are, the names of which are nouns; and eventuality, of things which happen, the names of which are verbs. The organ is situated in the middle of the forehead, and those in whom it is much developed have a peculiar prominence of this part of the skull.

31. Time. The faculty of time conceives the duration of phenomena, their simultaneousness or succession. Its organ is situated above the middle of the eye-brow.

32. Melody or Tune. The organ of tune bears the same relation to the ears as that of colour does to the eyes. The ear is the instrument by which sounds are heard, but it has no recollection of them, and does not judge of their relations; these are the offices of a peculiar and original mental power, whose organ is above the outer part of the eye-brow, so that when much developed, it enlarges the lower and lateral part of the forehead.

33. Language. This is the faculty which makes us acquainted with arbitrary signs, which remembers them, judges of their relations, and gives a disposition to indulge in all exercises connected with words. Its organ was the first that Dr. Gall discovered: in his youth he observed that while he had great difficulty in committing his lessons to memory, there were many boys who could easily learn by heart even things which they did not understand so well as he did. He noticed that all these boys were 'bull-eyed,' that is, had a peculiar prominence of the eye-ball, which seemed to project from its socket. Subsequent observation enabled him to confirm the opinion that the organ of verbal knowledge is situated at the very back part of the orbit, which is, with the eye, pushed forward by it when it is much developed.

34. Comparison is the reflective faculty which compares the sensations and ideas excited by all the other faculties, and points out their difference, analogy, similitude, or identity. It induces men to argue from analogy, to draw illustrations of their subjects from things well known, to speak by parables, and explain by examples and similes. It leads to the invention and employment of figurative language, and according to the degree of its national development, the language of each country will be full of or deficient in figures and metaphors. Its organ is situated in the middle of the upper part of the forehead.

35. Causality. The reflective faculty which engages men in the study of the causes and origins of things, and which guides to the employment of processes of induction, is thus named. The faculty of individuality makes us acquainted with objects; eventuality, with facts; comparison, with the analogy, identity, difference, and other relations of things; and causality leads us to search for their causes: together, these faculties, when fully developed, constitute the truly philosophic mind. The organ of causality is at the upper part of the forehead, on each side of comparison, and their coincident development gives the peculiar fullness of the front of the head, which is universally regarded as the sign of a powerful reasoning intellect.

Having now given a general view of the principles of phrenology, as stated in the writings of Dr. Spurzheim, and adopted by most of the present advocates of the system, it will probably be desirable to consider how far it is what it 'professes to be, a system of philosophy of the human mind, founded on the physiology of the brain.' (Combe, *System of Phrenology*, p. 1.) Neglecting for the present all metaphysical views of the subject, and regarding the theory of the existence of some such primary faculties of the mind as are assumed in phrenology, and of the dependence of each upon a separate portion of the brain, as one deserving of being tested by observation, we will examine only how far the doctrine, as it now stands, is supported by facts of anatomy and physiology, and whether it is capable of being established by the evidence of craniological investigation.

Many of the objections commonly made against phrenology are undoubtedly of little weight: such for example are the statements that in consequence of the irregularities of thickness in the coverings of the brain, it is impossible to determine its form by examination of the exterior. This objection only shows that there are sources of fallacy in the practice of craniology, a fact which no phrenologist denies. But on the greater part of the head, the differences of thickness of the coverings of the brain are not such as would lead into error; the majority of them are nearly constant in their amount, and are easily recognised by any one acquainted with the anatomy of the skull, and the rest are not sufficient to give that degree of elevation or depression to any part of the exterior of the head which would be regarded as indicative of excessive or deficient development of any organ. No one accustomed to post mortem examination can hesitate to admit that the form of the greater part of the exterior of the head corresponds as nearly with that of the surface of the brain as is necessary for craniological purposes. The parts in which the correspondence is often inexact are those over and in the neighbourhood of the eye-brows. The thickness of the superciliary ridge of the frontal bone is variable, and would certainly in some cases make a moderately developed organ appear large; and still more the size of the frontal sinuses (the cavities between the two plates of the frontal bone immediately above and by the sides of the root of the nose) must always be a source of fallacy in determining the size of that part of the adult brain in which the organs of form, individuality, size, and weight, and part of that of locality are supposed to be placed. The estimate of the supposed organ of language also, which is indicated by the prominence of the eye, must be liable to error from the varying quantity of the contents of the orbit. From these several circumstances however the utmost objection that can be raised is, that there must in general be some difficulty in determining the size of these few parts of the brain. In consequence of disease also the whole or parts of the brain may diminish in size without being accompanied by any corresponding change in the external form of the skull.[*] But as a general rule the subjects of disease are excluded in phrenological observations. The objection that parts of the brain have been destroyed without affecting any of the faculties of the mind is also of little weight, unless it be first proved that the organs are not double. The cases of this kind recorded before the promulgation of phrenology cannot fairly be deduced as evidence, because the statements which they contain relative to the preservation of the mental faculties after injuries of the brain, regard only the general powers of sensation, volition, memory, imagination, &c., and not the primary faculties of phrenologists, some of which might have been deficient without their loss being observed. The observations that have been made since, it must be confessed, are not of more weight against phrenology, than those of the loss of peculiar faculties (especially those of language and amativeness) by injury and disease of the brain are in its favour. Experimental mutilations of the brains of animals must be regarded as affording still less conclusive evidence; when a part of the brain is thus removed, the condition of the whole of the rest of its mass is altered by the removal of the pressure of the skull, exposure to the influence of the atmosphere, interference with the circulation of its blood, &c. It is impossible that a correct conclusion upon any part of the functions of the brain should be drawn from experiments of this kind; and the whole of the arguments deduced from them by Rudolphi, Magendie, and others, may therefore be neglected.

Fully admitting the insufficiency of these, as of some other minor objections to phrenology, we come to the consideration of some which must be regarded as more important. If phrenology were true, it might be expected that its applications would extend through the whole animal kingdom, and that according to the degree in which each mental faculty is developed in each animal, we should find a corresponding portion of its brain large or small when compared with that of man. Yet this is so far from being the case, that phrenologists are compelled to rest their opinions almost exclusively on evidence derived from the comparison of the brains of different individuals of the same species, and to suppose that though many faculties are the same in man and the lower animals, yet in each species they are manifested in some peculiar form and structure not admitting of comparison with those of man. This is evidently contrary to the analogical mode of reasoning which they pursue in other instances: all eyes, all ears, and all organs of smell are formed on the same principles, and so we might presume are all organs of the mind; so that as by the size or extent of distribution of their nerves we can determine in each animal the power of its sense of smell or sight or hearing, so by the size of a special part of the brain we might in each estimate the energy of some corresponding faculty. Between the vertebrate and the invertebrate animals, for example, there is an abrupt step in the condition of the nervous system; the brain and spinal chord of the lowest of the former class differ widely from the supra-œsophageal ganglion and the gangliated cords of the latter; we might therefore expect to find an equally sudden deterioration of mental power. Yet none such occurs: but although the supra-œsophageal ganglion (which may be regarded as the brain of insects) is only so much larger than the rest of their ganglia as is proportionate to the number of organs requiring to be supplied with nerves from it, yet none will deny that many insects exhibit more exalted psychical powers than the majority of either fish or reptiles do. But, taking the vertebrata alone, in all of which there is a certain general plan observed in the nervous system, it is not found that in each order or species, when compared with the rest, the parts of the brain are developed in proportion to the energy of the faculty ascribed to each of them. The phrenological function of the cerebellum, for example, is almost equally powerful in all species; yet the absolute and proportionate size of the cerebellum regularly lessens as one descends through the order of vertebrata, and in the batrachia, in which its supposed function is extremely energetic, it is a mere narrow cord passing across the fourth v[illegible]he part of the brain too, which is found decreasing as it is examined in the descending scale of vertebrate animals, is not the anterior, the seat of the intellectual faculties, but the posterior, in which are placed the organs of the animal propensities. A fair mode of comparison to determine this is to be found in the degree in which the hinder part of the cerebrum overlaps the cerebellum; in man alone does the former ever completely cover the latter; in idiots it often fails to do so; in monkeys it covers a still less portion; and continuing to descend through mammalia, the posterior lobes of the cerebrum grow constantly smaller, and the cerebellum is proportionally more, and at last completely, exposed. From these facts it might be assumed that the posterior lobes are the seat of some intellectual faculties; and such an assumption can be avoided only by believing that there is no analogy between the form of the posterior lobes of the cerebrum in man and mammalia. It is not denied that these apparent anomalies may exist, and yet phrenology may be true; but in balancing the probabilities of its truth or falsity, they must not be neglected.

The necessity which is felt of limiting the comparison of cerebral and psychical development to individuals of the same species[*] proves that some other condition than size is essential in determining the energy of each faculty, and that peculiarity of form and position of parts of the brain may give the external appearance of excess or deficiency of size; admissions which must throw doubt on the sufficiency of the only means which phrenology possesses of collecting facts to support its theory. If structure and form render it impossible by the size alone to determine the comparative psychical characters of two individuals of different species, the same conditions may often disturb the results that should proceed from comparisons of size in the organs of two of the same species.

In the limited field of the comparison of different individuals of the same species, phrenology is said by its supporters to be established by numberless facts of the correspondence of strength or weakness of each of the faculties with proportionate extent or deficiency of development of its organ; and they maintain that conclusions thus drawn from facts can be overthrown only by facts that contradict them.* But the numerous sources of fallacy which render the presumed facts for phrenology doubtful, present as great an obstacle to the collection of facts against it; and although its theory, which possesses so much plausibility, cannot be altogether overthrown by anything but well-ascertained facts, yet it is fair for any one to withhold his assent to it till he believes that it is supported by a sufficient number of positive and unerring observations; and the more so when he finds it opposed by some, however few, facts, and incapable of explaining several circumstances that might be expected to be placed under its laws. For these reasons the fallacies to which craniological observation is subject must be admitted as casting doubt upon the testimony of phrenologists, who, granting that they are unwilling to deceive, may yet, like all other observers, be charged with the liability to be themselves deceived. We believe that in this we do not step at all beyond the commonly adopted rules of judging from evidence, according to which it is open to every one to disbelieve statements and conclusions that seem to him improbable, although he may not be in a position to disprove them all by facts.

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[*] It is commonly stated in phrenological works that as the brain diminishes in size the internal table of the skull grows inwards, increasing the thickness of the skull. The writer is convinced from numerous observations that the space left in the cavity of the skull by the diminution of the volume of the brain is in a large majority of instances filled up by an accumulation of fluid in the pia mater and in the ventricles [BRAIN]; and that the skull rarely undergoes any such change in its thickness as would be phrenologically important. Even when the whole, or, as is more rarely the case, a part of the skull does thus increase in thickness, it does not indicate that there was wasting of the parts of the brain immediately beneath it, but more frequently is consequent on a diminution of parts deeply situated, as the optic thalami and corpora striata. The examination of the skulls of those in whom particular organs are supposed to have wasted, must therefore be too fallacious to admit of any conclusions being drawn from them.

[*] Although, to meet the objections mentioned above, phrenologists insist on the necessity of comparing only individuals of the same species, it is to be observed that they readily make use of illustrations favourable to their opinions obtained by the contrary means, as for example in the determination of the organs of combativeness and destructiveness by a comparison of carnivorous and herbivorous animals, and of that of constructiveness by comparing the heads of the hare and the rabbit.

Judging by these rules, the very perfection to which phrenology is supposed to have nearly attained is strong evidence of its improbability. No one will deny that, in its connection with the body, the human mind must be the most difficult branch of physiology. Yet if phrenology be true, the physiology of the brain is more advanced than that of any other organ in the body; and the improbability is presented that two physiologists accomplished more in about 50 years of study of the most difficult branch of the science of life than the united generations of physiologists of all classes for near 2000 years have effected in the most easy. There is not one function of the living body which can be so perfectly illustrated by the most accomplished physiologist as (if phrenology be true) the functions of the mind can be elucidated by a mediocre adherent to its doctrines; and this too while, to every source of fallacy which it has in common with other departments of physiology, it is subject to still greater which are peculiar to itself.

The improbability that the labour bestowed upon phrenology should have had so extraordinary a result, will appear greater when some of the fallacies are pointed out to which the observations that serve for its basis are subject. Admitting that the size of a part of the brain may be taken as a measure of the power of the faculty of which it is presumed to be the organ, it can be a correct measure of power only when all other conditions are the same. This is admitted by phrenologists, who maintain only that, *cæteris paribus*, size is a measure of power; and it may be admitted that in this proposition they are supported by the analogy of other organs of the body. But in all of them, and therefore probably in the brain, the other conditions are fully as important as size; yet phrenologists in their usual practice refer to quality of the brain only when they find that the indications of quantity are manifestly opposed to their opinions. Moreover the estimate which phrenologists make of the quality of the brain, by observing the external appearance and temperament of the individual, is fallacious as a measure of the state of the whole mass, and is valueless as a sign of the structural condition of each of its several parts. But any one part of the brain may as well differ from the rest in quality as in quantity; an assumption which the phenomena of local diseases, which are much more common than general diseases of the brain, are sufficient to establish, and which phrenologists themselves admit in their explanation of monomania. There is here therefore a manifest source of fallacy in every phrenological observation; a source of fallacy comparable with, but greater than, most of those which have so long obscured the knowledge of the more simple departments of physiology. No one who has had any opportunity of appreciating the difficulty of analysing observations of which such a varying source of error as is here indicated forms a constant part, can avoid suspecting that phrenologists, when they pretend to have overcome the difficulty, have merely wandered into the facilities of error. Again, if the condition of quality (in which are included many important circumstances connected with both the temporary and permanent state of the brain, each of which is probably not less important than size) must be regarded as a constant source of inappreciable error in estimating the material condition of the organs, there is scarcely less fallibility in the other element of a phrenological observation, viz. the determination of the mental character of the individual examined. The actions of men are taken as the index to their phrenological state; but (not to mention the cases in which men feign the possession of dispositions and opinions which are not their own) it is evident that in numerous instances, in which there is no intention to deceive, the same actions proceed from different motives, and this phrenologists fully admit, for in many cases in which the size of certain parts of the brain does not agree with the apparent energy of the functions usually allotted to them, they refer the prominent actions of the individual under examination to the excess or defect of some other parts of the brain. But if in one case an apparent disagreement between the state of any faculty and of its presumed organ is thus easily capable of explanation by the condition of other faculties and organs, then in every case the state of all the other faculties must become an inappreciable source of fallacy in endeavouring to estimate the condition of any one.

It is unfair to make use of these supplemental modes of determining characters in cases that are opposed to phrenology, and not to admit their influence in those which seem favourable to it. If the actions of a man are to be taken as the index of his mind—but if at the same time it is allowed that the same actions may result from different propensities, desires, and tastes, it is evident that it will be almost impossible to bring the evidence of facts to bear against phrenology, in which there must then be so many facilities of escape from conviction of error. If, to take an illustration from the writings of Sir G. Mackenzie, a young man in whom locality and inhabitiveness are very moderately developed is yet irresistibly impelled to go to sea, by a mechanical genius, and by attachment to the mechanism of a ship, conjoined with perseverance, courage, love of approbation, and ideality, there can surely be no certainty that any one propensity is proportioned to the condition of a single organ rather than to the combined condition of several others.

When we point out these sources of fallacy in every phrenological observation that has been made, and add to them the doubt which is cast upon it by the total absence of any anatomical peculiarity in the brain correspondent with the presumed separation of its organs, and by the failure of its application in the comparison of the psychical condition of man and animals, sufficient has been done to show that a person exercises a justifiable and even a philosophical degree of caution in withholding his assent from phrenology as it at present stands. He may grant, as the writer does, that its theory is ingenious and probable; that its plan of classifying the faculties of the mind is probably more natural than that of any other psychological system; that the existence of many of the assumed faculties admits of little doubt; that a comparison of the heads of different nations and individuals renders it almost certain that the general divisions of the part of the human cerebrum are correct; that in many cases, on balancing the evidence on each side, the result is on the whole favourable to the belief that the positions of several of the organs in each part of the brain have been nearly determined; but without further and very extended inquiry, and that made with a just appreciation of the difficulties of attaining to facts, when so many of the elements of the observations are inappreciable, and conducted by a disposition to doubt rather than to find confirmation of the doctrine assumed, he will hesitate to accept its theory further than as a direction to his inquiries, and will refuse to admit its applications in any important practice.

PHRO'NIMA, Latreille's name for a genus of Amphipodous crustaceans.

Generic Character.—*Two* very short setaceous antennæ composed of a small number of joints. Four first feet (*mâchoires exterieures* of Latreille) in the form of small compressed arms, terminating in a point, and dentated below: the two interior the smallest, and annexed to the head. Fifth pair of feet largest of all, terminated by a didactylous claw. Six vesicular sacs divided into three pairs and placed at the internal base of the six last feet. Head very large, cordiform, and vertical. Body very soft, narrow, and long.

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* Dr. Spurzheim and his followers constantly call upon the public to decide upon phrenology by their own observations; proving that they regard it no difficult matter to observe and draw correct conclusions in the most ambiguous questions of physiology. Upon this plan there is certainly no theory so absurd but it will easily gain adherents. One cannot feel assured that persons who are so little sensible of the difficulties of observation are themselves fully competent to observe. The more philosophic Dr. Gall did not fail to admonish his auditors not to attempt practising phrenology.

Tail more delicate than the body, terminated by six stylets (which are elongated and forked at the end), and provided below with four or six natatory feet disposed in pairs, under the third, fourth, and fifth rings; these feet being formed by a small joint for their articulation with the tail, of a large, oval, flattened joint, and two terminal filaments. (Desm.)

Examples, *Phronima sedentaria* and *Phronima Custos.*

The first (*Cancer sedentarius*, Forsk.; *Cancer gammarellus sedentarius*, Herbst.) has a transparent body, which is nacreous and dotted with reddish. Length not exceeding an inch.

Locality and Habits.—Lives at some distance from the coast, and keeps, according to M. Risso, in the interior of the body of *Radiata* belonging to the genera *Pyrosoma* and *Beröe.* Found in the Mediterranean and near Burray in Zetland.

Phronima Custos is smaller than the preceding, and very white. Found near Nice, in the interior of *Medusæ* (*Equorea* and *Geronia* of Péron and Lesueur). (Risso.)

PHRO'SINE, M. Risso's name for a genus belonging to the second section of *Amphipoda*, viz. those furnished with *four* antennæ.

Generic Character.—Two superior antennæ, large and spoon-shaped; two lower antennæ, setaceous and very small. The ten feet properly so called monodactyle, formed of five flattened joints: the first pair short, delicate, and hooked; the second a little shorter than the third; the fourth very large, with its first joint wide and oval, the two following triangular, the fourth oval and spiny, and the last long, pointed, arched, and falciform; the fifth pair shorter than the preceding, but of the same form. Body oblong, rather arched, somewhat rounded on the sides, with crustaceous transverse segments. Head prolonged in front in the form of a muzzle. Tail composed of five segments, which are nearly quadrangular, terminated by two oblong ciliated blades, and an intermediate short plate, which is flattened and rounded at the end. (Desm.)

Examples, *Phrosine semilunata* and *Phrosine macrophthalma.* The first has an oblong body, yellowish anteriorly, red posteriorly; the head is provided with two small horns, which form a sort of crescent; eyes small. Total length seven to eight lines.

Locality and Habits.—This species is rather rare in the neighbourhood of Nice, where it appears in the spring at the season of reproduction. Inhabits deeps on a sandy bottom. Eggs transparent.

Phrosine macrophthalma has an oblong violet-red body, with a transparent head; no horns; eyes very large, oval, and black; size less than half of that of the preceding species. Found by M. Risso on *Pyrosoma*, in February and July: at the latter period, the female is loaded with a quantity of very small globular eggs. (Risso.)

PHRYGIA (*Φρυγία*), a country of Asia Minor. It is difficult to define accurately the boundaries of Phrygia, as they differed at various times. Under the early Roman emperors it was bounded on the west by Caria, Lydia, and Mysia; on the north by Bithynia, on the east by Galatia and Cappadocia, and on the south by Lycia, Pisidia, and Lycaonia. Before the establishment of the province of Galatia by the Gauls, who invaded Asia Minor, Phrygia extended as far as the Halys. The antient writers speak of the Great and the Lesser Phrygia; but when Phrygia is spoken of by itself, the former is always intended, as the latter was only a political division, and was included in Mysia, which was inhabited by several Phrygian tribes. The northern part of Phrygia Proper was called Phrygia Epictetus, or the 'Acquired,' a name given to it when it was annexed by the Romans to the kingdom of Pergamos (Strabo, xii. 567); and the southern part, which bordered upon Mount Taurus, was called Phrygia Paroreius from this circumstance. In the fourth century the Romans divided Phrygia into two provinces, Phrygia Salutaris and Phrygia Pacatiana; the former comprising the eastern and the latter the western part of the antient province.

Phrygia is a high table-land, supported on the south by Mount Taurus, and on the north by the high range of mountains which runs from west to east under the antient names of Ida and Temnon in Mysia, and Olympus in the neighbourhood of Brusa. Herodotus says (v. 49) that Phrygia is exceedingly fertile; but this remark must be applied only to the western and northern parts of the province, since the country in the southern and eastern parts is covered with salt marshes, rivers, and lakes, which have no visible outlet. Of these salt lakes, the most curious is the one called Tatta by Strabo (*Tuzla*), which is 30 miles in length, and supplies a vast tract of country with salt. [Anatolia, p. 494.]

The Phrygians are said to have been a very antient people. According to a ridiculous tale told to Herodotus in Egypt, Psammitichus, king of Egypt, made an experiment, by which he ascertained that the Phrygians were the most antient people in existence. (Herod., ii. 2.) Herodotus says in another part of his work (vii. 73), on the authority of the Macedonians, that the Phrygians were a European people, and originally dwelt in Macedonia, where they were called Briges, which account is also given by Strabo (vii. 295). They are said by Conon (*apud* Phot.) to have passed over into Asia a hundred years before the Trojan war. Xanthus says (*apud* Strab., xiv. 680) that they emigrated from Europe subsequently to the Trojan war; but, as Strabo remarks, this could not have been the case, as they are represented by Homer (*Il.*, iii. 187) as settled on the banks of the Sangarius before that period.

We know scarcely anything of the early history of Phrygia. There appears to have been a kingdom of considerable power in the northern part of Phrygia under the Midian or Gordian dynasty. Strabo remarks (xii. 568) that the palaces of Gordius and Midas were near the river Sangarius, the neighbourhood of which was probably the central part of the dominions of these sovereigns; and that such was the case is confirmed by an antient inscription discovered at Doganlu by Colonel Leake, in which we find written in Greek, 'To King Midas.' (Leake's *Tour in Asia Minor*, p. 31.) The first of this dynasty of whom we have any authentic account is Midas, the son of Gordius, who was the first of the barbarians who sent offerings to Delphi. (Herod., i. 14.) As Herodotus says that these offerings were earlier than those of Gyges, king of Lydia, Midas must have reigned before B.C. 718. The Phrygians were conquered by Crœsus and added to the Lydian empire (Herod., i. 28), and were subsequently subject to the Persians. (Herod., iii. 90.) On the division of Alexander's dominions, Phrygia first came into the hands of Antigonus, and afterwards formed part of the dominions of the Seleucidæ. After the defeat of Antiochus the Great, Phrygia was given to Eumenes, king of Pergamos, and on the death of Attalus, B.C. 133, it came by his bequest into the hands of the Romans, together with the other dominions of the kings of Pergamos. [Pergamos.]

In Northern Phrygia, the first town of importance on the west was Azani, near the source of the Rhyndacus (*Lubod*), which flows into the lake Apolloniatis. This town is not often mentioned by the antient writers, but it must have been a place of considerable importance, from the description of its ruins given by Major Keppel, who says that the modern village of Tjandere Hessar is entirely built out of them. S.E. of Azani was Cotyæium, or Cotyæum (*Kutaya*), on the Thymbrius, which is still a considerable place. North of Cotyæium and also on the Thymbrius, at no great distance from its union with the Sangarius, was Dorylæum. (Strabo, xii. 576.) This town is alluded to by Cicero (*Pro Flacco*, 17), and is said by Athenæus (ii. 43. Casaubon) to have possessed some warm springs in its neighbourhood. Colonel Leake (p. 18) supposes it to correspond to the modern town of Eski-shehr, which is celebrated for its natural hot baths. Dorylæum is often spoken of by the Byzantine historians. East of Dorylæum was Midæum, also in Phrygia Epictetus (Strabo, xii. 576), which was originally one of the royal cities of the antient kings of Phrygia. (Strabo, xii. 568.) South of Dorylæum was Nacoleia, which is frequently mentioned by the later writers. Colonel Leake (p. 24) thinks that Nacoleia corresponds to the modern village of Pismesh Kalesi, near the valley of Doganlu, where he discovered some very remarkable monuments, which he supposes to have been the sepulchres of the antient kings of Phrygia. The Phrygian Ancyra [Ancyra] is conjectured by Mr. Hamilton (*London Geog. Journ.*, vol. viii.) to have been at Kilíseh Köï, at the western extremity of the lake of Simáwul.

In the south-eastern part of Phrygia was Synnada, one of the most important towns of this part of the province in the time of Pliny, who says (*Hist. Nat.*, v. 29) that it was a conventus juridicus for all the surrounding towns. Strabo however says (xii. 577) that it was not a large town, and that it was situated at the end of a plain sixty stadia long, and planted with olives. It was a place of considerable commerce and traffic, as it was situated on the road from

Apameia Cibotus to Galatia (Liv., xxxviii. 15), and also in the way, or nearly so, from Apameia to Iconium and Cilicia. (Cic. *ad Att.*, v. 20; *ad Famil.*, xv. 4.) Colonel Leake (p. 54) thinks that the site of Synnada corresponds nearly to the modern village of Buiwudun. At a short distance to the north of Synnada was Docimia, which was celebrated for its marble quarries. It was of a light colour, interspersed with purple spots and veins, and was in great request among the Romans. (Strabo, xii. 577; Stat., *Silv*, i. 5, 37; Plin., *Hist. Nat.*, xxxv. 1.)

The most important cities in Phrygia were situated in the south-western part of the province. Of these cities Celænæ was the most antient. Herodotus says (vii. 56) that it is situated at the source of the river Mæander, and also of the Catarrhactes, a stream not less than the Mæander. The Catarrhactes appears to be the same as the Marsyas of Xenophon (Xen., *Anab.*, i. 2, § 7) and other writers. Xerxes, after his defeat in Greece, is said to have built here the citadel and a palace (Xen., *Anab.*, i. 2, § 9). The younger Cyrus appears to have frequently resided at Celænæ, where he had a palace and a great park full of wild beasts. Celænæ was celebrated in Grecian mythology for the contest between Apollo and Marsyas. Xenophon says that Apollo hung up the skin of Marsyas in the cave whence the river flows. Near Celænæ was Apameia Cibotus, which was founded by Antiochus Soter, who removed to the new city the greater part of the inhabitants of Celænæ, which became in consequence a place of small importance. Antiochus gave it the name of Apamea, from his mother Apama, who was the daughter of Artabazus and the wife at that time of Seleucus Nicator. (Strabo, xii., p. 578; Liv., xxxviii. 13.) Apamea soon became a place of great wealth, and in the time of Strabo was second only to Ephesus in Asia Minor in commercial importance. Pliny says (*Hist. Nat.*, v. 29) that it was the capital of a conventus. There has been considerable doubt respecting the site of Apamea, but it appears, from the testimony of Pococke, Mr. Arundell, and Colonel Leake, to have been at a place called Dinglar or Dunare.

South-west of Apamea, and a little to the south of the river Lycus, was Colossæ, which is mentioned by Herodotus (vii. 30) and Xenophon (*Anab.*, i. 2, § 6) as a large and flourishing city. Strabo (xii. 576) and Pliny (v. 29) however speak of it as only a small place. At Colossæ there was formed a Christian church, chiefly, it appears, by the labours of Epaphras (*Col.*, i. 7; iv. 12, 13), to which St. Paul, who does not appear to have ever visited Colossæ himself (*Col.*, ii. 1), wrote an epistle. Colossæ was destroyed by an earthquake, together with Hierapolis and Laodicea, in the ninth year of the reign of Nero (Oros., vii. 7), but was built again, and became in the middle ages a place of considerable importance under the name of Chonæ. Chonos is at present a small village, situated under a very high hill; the ruins of the antient city may be traced for nearly a mile. (Arundell's *Visit to the Seven Churches*, p. 94-98.)

West of Colossæ, and a little to the south of the Lycus, was Laodicea, which was a large commercial town in the time of Cicero (*Ad Fam.*, ii. 17; iii. 5) and Strabo (xii., p. 576). Pliny (v. 29) says that it was originally called Diospolis, and afterwards Rhoas; and we learn from Stephanus Byzantinus that its name was changed into Laodicea in honour of Laodice, the wife of Antiochus II. There was a Christian church at Laodicea in the time of the Apostles. St. Paul speaks of this church in his epistle to the Colossians (ii. 1; iv. 16); and St. John, in the book of the Revelation (iii. 14-16), rebukes its members for their lukewarmness in the cause of the gospel. Strabo says that Laodicea was celebrated for the sheep which fed in the plains around it, and that their wool was considered superior to that of Miletus. The ruins of Laodicea, which are considerable, are seen a little below Denisli.

Nearly opposite Laodicea, to the north of the Lycus, was Hierapolis, which was celebrated for its mineral springs. (Strabo, xiii. 629.) The ruins of Hierapolis, according to Chandler (*Travels in Asia Minor*, p. 290), are on the site called Pambouk-kalessi, and are about a mile in length. There are remains of a very large theatre and of other public buildings.

PHRYGIAN MODE, in antient Greek music. [Mode.]

PHRY'NICHUS. Several persons of this name are mentioned by Suidas and others.

Phrynichus of Athens, the son of Polyphradmon, was a disciple of Thespis, and a writer of tragedy. He was upwards of twenty years the contemporary of Æschylus, and probably he was about so many years his senior. The titles of fourteen tragedies of Phrynichus occur, of which five have been supposed to be the productions of another Phrynichus, the son of Melanthas: but Bentley has clearly proved that this supposition is without any foundation, and that there was only one tragic poet of this name.

Phrynichus first exhibited B.C. 511, and he gained the prize for his 'Phœnician Women' (*Φοινισσαί*) B.C. 476, the subject of which was drawn from contemporary history, being the victories of Athens in the Persian wars. It appears from these dates that he was a dramatic writer during thirty-five years, but we know not the time either of his birth or his death.

Phrynichus effected a great improvement in the tragedy which Thespis had introduced. He no longer sanctioned the ludicrous diversion in which Bacchus and the Satyrs only were personated; but he derived the subjects of his plays from the graver parts of the mythology and history of his country. With the example of Æschylus to stimulate him, he made still further advances. One of his tragedies, 'The Capture of Miletus' (*Μιλήτου ἅλωσις*), referring to an event which took place B.C. 494, five years after Æschylus won his first prize, is particularly mentioned by Herodotus (vi. 21). He relates that the poet melted the spectators into tears by his vivid picture of the sufferings of their Ionian brethren. It may be presumed that his 'Phœnissæ,' which won the prize B.C. 476, was marked by equal if not superior excellence. Aristophanes on several occasions brings in the name of Phrynichus in such a way as to show that he was esteemed a poet of no ordinary powers.

But Phrynichus did not invent the dialogue; he had only one actor, at least until Æschylus introduced the dialogue; the choral ode still constituted the chief part of the performance. The improvement of first adding the dialogue and shortening the chorus is due to Æschylus; Phrynichus first introduced female parts. No fragments of Phrynichus are extant. (Suidas, *Lexicon*; Bentley's *Phalaris*; Müller's *Hist. of Greek Literature*.)

Phrynichus of Athens, a comic poet, who flourished B.C. 430. Ten comedies of his are mentioned by antient writers. (Suidas; Bentley.) A few fragments of this poet have been collected by Hertelius and Grotius. He is once quoted by the Phrynichus who forms the subject of the next article.

Phrynichus (called Arrhabius by Photius; and by Suidas, the Sophist of Bithynia), flourished under the emperors M. Aurelius and Commodus, from A.D. 170 to 190. He has left a work entitled 'A Selection of Attic Verbs and Nouns' (*ἐκλογὴ ᾽Αττικῶν ῥημάτων καὶ ὀνομάτων*), the object of which is to point out the proper use of certain words, and of certain forms of words, as alone authorised by the writers of pure Attic diction. This work has been several times printed. The best edition is that of Lobeck, 8vo., Leipzig, 1820, which contains the substance of all the annotations of the preceding editions, and is enriched with many original remarks. A fragment of Herodian, the grammarian, upon the same subject, accompanies the work of Phrynichus. Lobeck has added six dissertations (which he calls Parerga, in six chapters), suggested by his investigations in editing Phrynichus. These dissertations exhibit deep learning and sound criticism, and are of great value independently of their relation to Phrynichus. Four indexes conclude the volume, which is extended to 841 pages, besides eighty pages of preliminary matter. (Photius; Suidas; Fabricius.)

PHTHISIS (a Greek word, *φθίσις*, signifying 'corruption,' 'decay') was formerly used as a generic term to signify a wasting or consumption from any cause, and was afterwards more distinctly specified, according to the organ in which it was supposed to originate: hence we had a Phthisis Hepatica, P. Mesenterica, P. Pulmonalis, &c.; but the word is now restricted to the disease produced by tubercles in the lungs, and commonly known by the name of consumption. An acquaintance with this disease, from which neither age nor sex is exempt, and no part of the habitable globe is free, whose ravages extend even to the brute creation, and whose course when once begun can rarely be stayed, whose commencement is frequently so insidious, and whose termination so fatal, must, above all others, be interesting; for if by any precautions its development can be prevented, it is only by a knowledge of those influences which most frequently give rise to it that we can hope to attain our object.

Morbid Anatomy of Phthisis.—The local morbid changes peculiar to Phthisis are only the result of previous changes in the general system, an hereditary or acquired predisposition, cognizable by the physical condition of the patient, and by a disordered state of various functions; 'and which, though very generally accompanied with a feeble organization, is not inconsistent with too great development and inordinate action of particular parts, and even with considerable physical power of the system.' By far the most important and characteristic morbid change that occurs in Phthisis consists in the development of tubercles wherever they may be found; but as it is in the lungs that they first and most frequently manifest themselves, we shall describe them as they are seen in those organs. Tubercles of the lungs first appear in the form of small, grey, semi-transparent granulations, which gradually enlarge and become opake in their centre: the opacity increases, till the whole mass becomes of a dull yellowish-white colour. After a certain time they soften, empty themselves into the bronchial tubes, and give rise to excavations more or less considerable. In this way, almost the whole of both lungs may be invaded by a succession of tubercles, their healthy structure being absorbed as the tubercles become deposited, or involved in the destructive process consequent upon their softening. Tubercles, unlike inflammation, almost invariably commence at the summit of the lungs, where, as well as being more numerous, they are usually found in a more advanced stage of development than in any other part. The successive eruption of fresh tubercles is an important feature in this disease, as it explains the occasional recovery of patients labouring under consumption.' A crop of tubercles may appear in the lungs, go through the various stages above described, and give rise to all the symptoms of confirmed Phthisis; yet provided the conditions which gave rise to them are removed, no fresh eruption may take place, and the patient shall recover. The relative frequency of tubercles in other organs differs considerably in the adult and in the infant. In the former, M. Louis, our greatest authority in all matters connected with Phthisis, has, with one exception, never observed them in any organ without their existing in the lungs; so that he regards their presence in these last viscera as a necessary condition for their development in other parts. But in the infant this does not appear to hold good; the bronchial glands being more frequently affected than the lungs, in the proportion of 87 to 73. The brain and its membranes are likewise more subject to tuberculous deposits in the child than in the adult. The next most important lesion which is met with in phthisis is ulceration of the intestinal canal. The ulcers may vary in number, form, and size, but they all present specific characters peculiar to this disease and to no other, and exist in five-sixths of the cases which terminate fatally. The third peculiarity in reference to phthisis is the change that the liver undergoes; to which the French pathologists have given the name of 'Foie Gras,' or fatty liver. Lastly, ulcerations of the epiglottis, larynx, and trachea occur so frequently, and with such uniformity of type, as justly to lead to the belief that they are a part of the disease. But besides these morbid changes, which are peculiar to this disease, complications of various kinds occur which are common to it and other chronic diseases. By far the most frequent of these are inflammations of the Pleuræ; so that it is extremely rare, in making the post mortem examinations of persons who die of phthisis, not to find the lungs adherent, in part, or entirely, to the walls of the chest. Inflammation of the substance of the lungs is likewise a frequent complication in the latter stages of phthisis.

Symptoms of Phthisis.—These generally commence with a slight cough, which at first excites no attention, but is regarded as a simple cold. The breathing is not seriously affected, nor is the appetite impaired. After a time the cough increases in frequency, and is accompanied by expectoration of a clear frothy saliva: the breathing and pulse become a little hurried after meals and towards evening; and at this time of the day there is frequently experienced a slight degree of chilliness, followed by heat, which continues during the greater part of the night, and is succeeded towards morning by perspiration. The patient likewise becomes somewhat paler, and is languid and easily fatigued. In some instances the first symptoms are preceded by a more or less copious hæmoptysis. In the second stage of Phthisis the cough becomes more frequent, especially during the night, and if violent, it sometimes occasions vomiting; hoarseness, or loss of voice, is not unusual: the expectoration changes its character; it is less frothy, and more opake; containing small particles of a yellowish curd-like substance; or the sputa are streaked with dull yellow lines; and hæmoptysis is pretty frequent, but in general not abundant; the breathing and pulse are more hurried: the fever is greater; and the perspirations more regular and copious. pains in the thorax, denoting pleuritic inflammation, often occur; and the languor and emaciation still increase. In the last stage of consumption there is nearly always profuse diarrhœa, and the sweats and expectoration are more copious: the latter becomes more uniform in composition, and is separated into roundish distinct masses, with flocculent edges. The emaciation and debility keep pace with the other symptoms; and the feet and ankles swell towards evening: the appetite generally declines in the same proportion, and the patient dies in the extreme degree of marasmus, not unfrequently flattering himself to the last with a speedy recovery. In females the menstrual discharge almost always ceases when hectic fever is established; and occasionally even before that is the case, which has led to a popular opinion that the disease in such cases arises from the suppression. Such are the ordinary symptoms presented by Phthisis in its most usual form; but varieties exist in the order and duration of the morbid phenomena. Thus, tubercles may be developed in the lungs, and remain for a considerable period without exciting either cough or expectoration, or even any important general symptoms. In other cases they give rise to intense general symptoms; as fever, emaciation, anorexia, before they excite cough or expectoration; the latter appearing only a short time previous to death. To these cases the term *Latent Phthisis* has been applied; and what is remarkable in them is, the absence of appreciable organic alteration in organs whose functional derangement was most violent; while the only viscus really affected seems functionally healthy. The term *Acute Phthisis* is applied to those cases in which the disease goes through all its stages with unusual rapidity. It occurs most frequently in the young, and in those weakened by some previous disorder. In popular language it is designated galloping consumption. *Chronic Phthisis* is the reverse of the last, and comprehends all those cases in which the progress of the disease is unusually slow and generally intermittent.

Diagnosis of Phthisis.—Auscultation and percussion are the chief means by which we arrive at the diagnosis of phthisis [AUSCULTATION; PERCUSSION]; but there are several collateral circumstances which must be taken into consideration in order to form a correct opinion as to the nature of the disease. It is at the commencement of phthisis that an accurate diagnosis is of most importance, and in which the stethoscopic signs are least evident. We shall be therefore more particular in enumerating the indications at this period, than in accurately describing the acoustic phenomena which are present at a more advanced stage of the disorder. As bronchitis is the disease with which phthisis is most liable to be confounded, we shall place in juxtaposition the principal points in which they differ. In the greater number of cases of phthisis the cough comes on without any evident cause, and many months may elapse without expectoration. This apparent absence of cause and dryness of cough are of themselves very remarkable, and differ from what occurs in simple bronchitis. Thoracic pains, when present in the latter affection, are generally felt in the middle of the sternum; while in phthisis they are situated in the sides of the chest and between the shoulders. Hæmoptysis, from the commencement or during the progress of cough, is frequent in phthisis, and is almost a certain sign of the presence of tubercles; whereas this symptom never occurs in bronchitis. Out of twelve hundred patients affected with various diseases, not including cases of amenorrhœa or those arising from external violence, M. Louis found that not one, with the exception of phthisical cases, had experienced this symptom. Auscultation gives us little or no aid in the earliest stages of phthisis, and when the stethoscopic signs first manifest themselves, they are such as result from an increased density in the structure of the lung, and not from the presence of fluid in the bronchi, as is the case in bronchitis. Thus the expiration, which in health is scarcely audible, becomes more distinct; the voice more resonant; the sound elicited on percussion duller. These alterations in the respiration and in the signs produced by percussion, like the development of tubercles, take place from the summit to the base of the chest; and at first are almost constantly confined to the upper lobe of one side In bronchitis the sounds result from fluid in the bronchi, and originate in the lower part of the chest, and usually on both sides. In the more advanced stages of phthisis its diagnosis is less difficult, and is made from a consideration of the sputa, which we have already described, and from the signs furnished by percussion and auscultation. These are now decisive; the upper parts of the chest are dull on percussion; the respiratory murmur is strong, coarse, or even cavernous under the clavicles; and the voice listened to in the same situation gives rise to that peculiar phenomenon termed pectoriloquy. If there should be much fluid in the lungs, resulting from the patient's not having lately expectorated, we then have a mucous rattle in all those parts of the chest corresponding with the seat of the disease; and where cavities containing fluid exist, the air passing through this produces that gurgling noise to which the term gargouillement has been applied by the French. The space in which these different changes take place is at first limited; but it daily increases, and in some instances, where the entire upper lobe of the lung is converted into numerous excavations, the respiration is coarse and more or less tracheal throughout its whole extent. The diagnosis of latent phthisis is not difficult, provided we make use of the proper means for ascertaining the condition of the pulmonary organs; the evil is, that the attention is directed exclusively to those functional derangements which we have spoken of when describing latent phthisis, while the real seat of the disease is overlooked.

Duration and Mortality of Phthisis.—Various circumstances affect the duration of phthisis, as age, sex, constitution, occupation, season of the year, climate, &c. In the upper ranks of life, where patients have all the advantages that a proper regimen, change of air, and good medical treatment can afford, the average duration of the disease is considerably above that exhibited in the table below.

Duration of Disease.	Number of Cases.		Number of Cases.	Total.
Months.	Louis.	Bayle.	Louis. Bayle.	
1	1	1	8 + 16	= 24
2	4	6		
3	3	9		
4	5	12	25 + 44	= 69
5	11	14		
6	9	18		
7	9	18	25 + 44	= 69
8	9	14		
9	7	12		
10	4	8	12 + 20	= 32
11	3	7		
12	5	5		
13	2	6	12 + 21	= 33
14	4	10		
15	6	5		
16	0	3	3 + 9	= 12
17	2	4		
18	1	2		
19	1	2	10 + 18	= 28
20	1	3		
21	0	6		
22	0	3		
23	0	2		
24	8	2		
Years.				
3	6	6	14 + 14	= 28
4	6	5		
5	2	3		
6	0	1	1 + 9	= 10
7	0	3		
8	0	1		
9	0	3		
10	1	1		
12	2	1	4 + 5	= 9
14	1	0		
20	1	4		
40	0	0		
	114	200	114 + 200	=314

The mean duration of 314 cases exhibited by this table is 23 months, including the extreme cases; but 162, or more than half of the cases, terminated in 9 months; and the greater proportion of them between the fourth and ninth month. By excluding those cases which terminate within four months, and those that exceed four years, the average duration of the remaining cases is eighteen months. With regard to the mortality from phthisis, it varies in different climates, ages, sexes, races, and occupations. In England and Wales, according to the 'Report of the Registrar-General of Births, Deaths, and Marriages,' lately published, it is 19·55 per cent. of the total number of deaths, or 3·82 annually out of 1000 living. In France it is about the same. On the eastern frontiers of the Cape of Good Hope, where the atmospheric vicissitudes are sudden and great, the thermometer in summer sometimes varying from 110° to 64°, and in winter from 75° to 32° in the course of a few hours, it is only $3\frac{1}{4}$. Premising that a greater number suffer from phthisis among the military than the civil population, the following table, from Major Tulloch's 'Statistical Reports,' shows the number of men attacked annually by phthisis out of 1000 of white troops, at each of the following stations:—

	Windward and Leeward Command.	Jamaica.	Gibraltar.	Malta.	Ionian Islands.	Bermuda.	Canada.	Nova Scotia and New Brunswick.	Cape District.	Mauritius.	United Kingdom.
Attacked annually by Phthisis out of 1000 white troops at each of the following stations.	12	13	$6\frac{5}{10}$	$6\frac{7}{10}$	$5\frac{2}{10}$	$8\frac{8}{10}$	$6\frac{5}{10}$	7	$3\frac{1}{3}$	$7\frac{7}{10}$	$6\frac{6}{10}$
Deaths annually per 1000 from all diseases of the lungs at the same stations.	$10\frac{4}{10}$	$7\frac{5}{10}$	$5\frac{3}{10}$	6	$4\frac{8}{10}$	$8\frac{7}{10}$	$6\frac{7}{10}$	$7\frac{1}{10}$	$3\frac{9}{10}$	$5\frac{6}{10}$	8

In the perusal of this table it must be borne in mind that the total mortality from all diseases of the lungs in the foreign stations appears to be less than it really is. This arises from many of the patients being invalided, who, if they die on their passage home, or after their arrival in Britain, are not included in the returns of the station where their diseases originated.

It may here be interesting to compare the influence of this class of diseases throughout the different stations where negro troops have been employed:—

	West Coast of Africa.	Honduras.	Bahamas.	Jamaica.	Mauritius.	Windward and Leeward Command.	Gibraltar.
Died annually per 1000 by diseases of the lungs in Black troops.	$6\frac{3}{10}$	$8\frac{1}{10}$	$9\frac{7}{10}$	$10\frac{3}{10}$	$12\frac{9}{10}$	$16\frac{6}{10}$	$33\frac{6}{10}$

Nearly two-thirds of this mortality arise from consumption. Thus, in his native country the negro appears to suffer from these diseases in a less proportion than British troops in their native country; but so soon as he goes beyond it the mortality increases, till in some colonies it attains to such a height as seems to preclude the possibility of his race ever forming a healthy or increasing population. The Hottentots in our army at the Cape of Good Hope suffer more from diseases of the lungs generally than the European troops; while the proportion of those who die from phthisis is about the same. In both cases the mortality is below the average, as is seen in the table before referred to.

The natives of some tropical climates seem so little subject to diseases of the lungs, that among 74,850 native troops serving in the Madras presidency, the deaths, by every description of disease of the lungs, did not, on the average of five years, exceed one per 1000 of the strength annually.

The period of life above puberty at which the greatest mortality from phthisis occurs is between 20 and 40, as will be seen by the following table; and it is worthy of remark that although the number of deaths from phthisis is more considerable from 20 to 40 than from 40 to 60, the general mortality is less in the first than in the second period.

Died of phthisis at the following ages:—

Age.	Deaths.		
	Louis.	Bayle.	Total.
15 to 20	11	10	= 21
20 30	39	23	= 62
30 40	33	23	= 56
40 50	23	21	= 44
50 60	12	15	= 27
60 70	5	8	= 13

In respect of sex, consumption destroys more females than males, in the ratio of 4·155 to 3·771. This includes the whole of England and Wales, but does not hold good as regards some cities and most of the mining districts. In these the pursuits of a large portion of the male population seem particularly inimical to health, and raise the mortality from phthisis nearly to what it is in the female, and in some places even above, as will be seen in the following abstract from the Registrar-General's Report:—

Died of phthisis from July 1st to December 31st, 1837, in the metropolis, whose estimated population on the 1st of October, 1837, was 1,790,451, and in the unions of the counties of Cornwall, Devonshire, Dorsetshire, Somersetshire, and Wiltshire, whose estimated population at the same period was 1,723,770—

Males.		Females.	
Metropolis.	Counties.	Metropolis.	Counties.
1947	1325	1930	1466

Died of phthisis from July 1st to December 31st, 1837, in the counties of Essex, Gloucester (except Bristol and Clifton), Hereford, Norfolk (except Norwich), Suffolk, Sussex, and Westmoreland, whose estimated population on the 1st of October, 1837, was 1,776,980; and in the districts of Aston, Bath, Birmingham, Bristol, Cambridge, Carlisle, Clifton, Derby, Dudley, Exeter, Leeds, Leicester, Liverpool, Manchester, Maidstone, Newcastle-on-Tyne, Northampton, Nottingham, Salford, Sheffield, Stoke-on-Trent, Sunderland, Wolverhampton, and West Derby, whose estimated population at the same period was 1,762,710—

Males.		Females.	
Cities.	Counties.	Cities.	Counties.
2118	1363	2130	1703

These tables point out generally the influence of occupation in the production of phthisis. In cities the majority of the male labouring population is engaged in the arts, trades, and manufactures, and generally for many hours together in ill-ventilated apartments, and in unhealthy postures of body. In the country the pursuits of the same class of persons are chiefly agricultural.

Having now considered the mortality of phthisis in connection with climate, race, age, sex, and occupation, we are enabled with greater advantage to examine into those causes which appear to be most active in its production.

Causes of Phthisis.—The causes of phthisis, says Sir J. Clarke, may be divided into 'the remote and the exciting, or those which induce the constitutional predisposition, and those which determine the local deposition of tuberculous matter after such predisposition is established. The one class of causes operates by modifying the whole system; the other, by determining in a system so modified the particular morbid action of which tuberculous matter is the product.' Of the remote causes, or those which induce the constitutional predisposition, perhaps the most powerful is that which arises from hereditary transmission; not that an individual born of consumptive parents will himself necessarily fall a prey to the same disease, but only that, when exposed to those influences which we are about to enumerate as determining the tuberculous cachexia, he will be more likely to become affected than one born of healthy parents. Next to hereditary transmission of the consumptive diathesis, the causes most active in producing this state of constitution are, a sedentary life, more especially when associated with a confined posture of the body and impure air; bad quality or insufficient quantity of food; insufficient clothing; excessive mental or bodily labour; mental depression; and abuse of spirituous liquors. In fact, all those agents which operate in depressing or lowering the tone of the system generally act as remote causes in the production of phthisis. The more immediate or exciting causes of consumption, those which determine the deposition of tubercles, have usually been attributed to irritants acting locally on the bronchial tubes or on the lungs, whether occasioned by inflammation of these parts or by the mechanical action of irritating bodies upon them. The result of the latest investigations on this subject leave no doubt that the influence exerted in this way has been greatly exaggerated. Pneumonia and bronchitis, the two diseases hitherto regarded as the most frequent forerunners and producers of phthisis, have been shown by M. Louis to exert no more influence in its production than any other disease. They may indeed occasionally hasten the development of tubercles, but they exert no specific effect, and they act only as remote causes in impairing the health generally. These conclusions of Louis, which have been deduced from his own observations in hospital practice solely, receive ample confirmation from the admirable Statistical Reports of the Registrar-General and Major Tulloch, which we have before referred to. The popular error of attributing consumption to cold, the breaking of a blood-vessel, &c., has probably originated from mistaking the effect for the cause. We have shown in a former part of this article that cough and hæmoptysis are among the earliest symptoms of tuberculous lungs. With regard to mechanical irritants, as dust of various kinds, noxious gases, smoke, &c., 'no opinion has been more prevalent,' observes Dr. Cowan, 'than that those who are exposed to the inhalation of the dust of vegetable, mineral, or animal substances, are peculiarly liable to phthisis; and in the supposition that consumption was essentially a disease of the lungs, and in the great majority of instances the result of bronchial inflammation, no conclusion was more natural or more probable. But once remove from the mind the impression of a necessary connection between bronchitis and tubercles, and we feel persuaded that the examination of the evidence brought forward on the subject of dust will terminate in the conviction that this agent exerts at most but a very secondary and unimportant influence in the production of phthisis.' The mortality among the workmen in some of our manufacturing towns is usually brought forward in support of the doctrine of mechanical irritation. Dr. Knight of Sheffield informs us that there is not an example of a polisher of forks reaching his 36th year, nor do the artisans in other departments attain a much greater age. But it must be recollected that many of these men work sixteen hours a day in a close atmosphere and confined posture of body, two conditions which contribute perhaps more than any other to the increase and production of phthisis. Nor has the mortality been diminished by the use of magnets, wire masks, currents of air, and moisture, which have been successively tried for the purpose of arresting the metallic particles. In the cases of 887 quarrymen, 557 stone-cutters, and 160 marble-workers, all of them occupations involving the inhalation of dust, M. Benoiston found the proportion of phthisis was less than the general average; but then these are employments carried on in the open air. Dr. Lombard, whose researches are founded on a total of 4300 deaths from phthisis, and 54,572 individuals, exercising 220 different occupations, found, by a comparison of all the professions carried on in the open air and in workshops, that the proportion of deaths from phthisis was *double* among the latter; and this proportion increased as the apartments were close, narrow, and imperfectly ventilated.

Mr. Watson, a surgeon of Wenlockhead, a mining district, informs us that, out of 74 men working during four or five months for sixteen hours daily in a mine where a candle burnt with difficulty, not one was attacked with any pulmonary affection. But whether from the inhalation of noxious gases or from other causes, it is certain that in the majority of the mining districts of this country the mortality from phthisis is high. The number of males attacked by this disease in Cornwall exceeds that of the females in the ratio of 170 to 140, and in the mining parts of Staffordshire, Shropshire, and Worcester, in the ratio of 203 to 191; while in the non-mining districts of Staffordshire and Shropshire, and in the county of Cheshire, the ratio is 656 males to 796 females.

The influence of smoke, when uncombined with other agents of injurious tendency, may, we think, fairly be called in question. In Leeds, which is certainly the most smoky place in the whole kingdom, the mortality of females from phthisis is below that of most of our large manufacturing towns, and is not much above the average for the whole of England and Wales. In London likewise this is the case, and in nearly the same proportion, as will be seen in the following table of the relative mortality of females from phthisis in each of the under-mentioned cities, and in England and Wales:—

Annual Deaths to 100,000 *living.*

Leeds.	Birmingham.	Manchester.	London.	Liverpool.	England and Wales.
401	494	510	402	670	386

It must not be forgotten that in these towns a large proportion of the female sex is occupied in those kinds of employment that we have before shown to be so prejudicial: how much then must be attributed to the smoke, if the unhealthy occupation were expunged from the account? From what we have advanced against the operation of local irritants as causes of pulmonary consumption, we by no means wish to be understood as deprecating the use of any means calculated to get rid of this source of irritation; but we merely propose to show that they act a very inferior part, and, when unassociated with those circumstances which modify the system in general, their real activity as causes of pulmonary tubercles is problematical. It would not however be fair to omit the mention of one fact, which in truth is the only one that we have met with, in evidence of a direct local irritation giving rise to tubercles. This fact is related by the late Baron Dupuytren. A boy was brought into the Hôtel Dieu for some surgical complaint, of which he died. On examining the body after death, a marble was found impacted in one of the bronchi; around this spot, but in no other part of the body, was found a small crop of tubercles.

A moist and changeable climate has been regarded hitherto as among the most active causes of consumption; and Great Britain, whose climate combines these two conditions in a remarkable degree, has been looked upon as such a nursery for phthisis, that our facetious neighbours on the other side of the Channel have styled it 'La Maladie Anglaise.' Indeed the notions of atmospheric vicissitudes, dampness, and consumption, seem almost inseparable. However, these opinions have been and still are undergoing a severe scrutiny; and the evidence which we at present possess on the subject tends very strongly to disprove their correctness. Moisture and climate, like all other agents, act either locally or generally; popular belief has attributed their presumed prejudicial effects to local action. They tend, it is said, to produce catarrhs and coughs, and consequently consumption. We need scarcely allude again to the fallacy of this opinion. We are in possession of little information on the mode in which climate operates to the production of phthisis. That the disease prevails to a much greater extent in some climes and localities than in others, is an indisputable fact; but it is no less certain that its prevalence is not confined to countries of variable temperature, for many of such countries suffer in a much less degree than those whose thermometric range varies little throughout the year. Nor does it appear that moist climates and localities are more inimical in this respect; indeed consumption is said to be rare in marshy districts; and Dr. Wells has brought forward a variety of interesting observations to prove that the causes of intermittent fever induce a state of constitution which is a protection from consumption; and he says that in countries where one prevails, the other is always absent, or at least much less prevalent. This certainly coincides with what has been observed on the western coast of Africa, the climate of which is moist in the extreme, and where fevers prevail to a frightful extent; yet diseases of the lungs are rare. It has been also observed that tanners, dyers, wool-scourers, brewers, brickmakers, washerwomen, and many other occupations in which the upper or lower extremities are exposed to wet, and the air is charged with aqueous vapours, present fewer cases of consumption than almost any others. Too much weight however must not be attached to these speculations, for accurate statistical data from fenny countries and localities are still a desideratum; and as respects the immunity enjoyed by persons exercising the trades just enumerated, it will be observed that they are all of them employments combining considerable muscular exertion with free exposure to the air. The wages too of this class of persons are generally such as to place them above want. Is phthisis contagious? This is a question which has been often discussed, and numerous are the testimonies both on the affirmative and negative side; but the weight of the evidence seems to rest with the non-contagionists.

Treatment of Phthisis.—This resolves itself into two kinds: first, the *prophylactic*, or that which has for its object the prevention of phthisis in those who are hereditarily or otherwise predisposed to the disease; and secondly, the *curative*, or that which endeavours to arrest its progress after tubercles have manifested themselves. Much may be done in the first case; but experience proves the limited control that we possess over it in the second. Phthisis, as we have said before—and, as we are anxious to impress this fact upon our readers, we again repeat—is not a mere local disease, or one arising from local causes; but it results from a general depravation or unhealthy condition of the whole system, of which tubercles are only an effect. They may be considered as the last of the embryonic changes previous to the nascence of the disease in a cognisable form.

This being premised, our prophylactic treatment must be directed towards the prevention or the arresting of the incipient changes which take place previous to the development of tubercles. With this view the most obvious rules are, to avoid all those causes which we have pointed out as tending to produce the tuberculous diathesis. Marriages should be made with greater regard to the health of the contracting parties. Children, especially if sickly, should be reared and educated with less anxiety about their mental progress than their bodily strength. Those professions and trades should be avoided which combine much sitting, with a confined posture of body, as those of tailors, shoebinders, shoemakers, milliners, lacemakers, engravers, jewellers, watchmakers, clerks, &c., all of whom are peculiarly subject to phthisis. Agriculturists, butchers, carters, coachmen, sailors, &c., are remarkable for their general health and their freedom from this complaint. All occupations therefore that are carried on in the open air should be chosen in preference to those of an opposite kind. Callisthenic exercises, when indulged in with moderation, are healthful, and should by no means be neglected. In short, everything which tends to invigorate the body diminishes disease; and it is proved by statistical facts, that wherever the mortality from disease generally is low, the mortality from phthisis is also low. The curative treatment of phthisis consists in regulating the health generally, and in combating particular symptoms. For the attainment of the first object, the diet should be nutritious, but not stimulant; and the exercise regular, but gentle, and not too prolonged. Horse exercise is particularly recommended in the incipient stage of phthisis, and travelling may be safely undertaken in certain circumstances. Of all the modes of travelling, sea-voyages are perhaps the most beneficial; and where much improvement has taken place during the voyage, it would be better to repeat it than hazard the doubtful benefit of a residence on land. The influence of climate on consumption, we are inclined to believe, is imperfectly understood. It has been laid down as a general principle, that the change from a variable temperature to one of an opposite description is in the highest degree advantageous, and, *cæteris paribus*, we think this may safely be admitted; but in recommending patients to climates which possess this uniformity of temperature, it has been too often overlooked that there are other counteracting circumstances which more than neutralise this advantage. Examples of the mortality from phthisis in many countries which are remarkable for the equability of their temperature, have been already adduced in a previous part of this article, where it has also been shown that the Madras presidency of India, and the eastern frontier of the Cape of Good Hope settlement, to which may be added New South Wales and South Australia, all of them countries subject to sudden and great changes of temperature, enjoy an extraordinary immunity from phthisis. The practice of sending patients to a foreign country who are in the last stage of consumption, cannot be too strongly reprobated. Much difference of opinion exists on the relative advantages attending a residence on the coast or inland for consumptive patients. From the great benefit of sea-air in all scrophulous disorders, and from a review of the causes of phthisis, we are inclined to think that the sea-coast on the whole is preferable. Where circumstances render removal to an anti-phthisical country impossible, confinement to apartments where the heat is regulated, and the purity of the air as much as possible preserved, during the more rigorous weather of this climate, may be recommended. It must however be recollected that this mode of treatment, being unfavourable to improvement of the general health, should only be enforced when exposure to the air is constantly attended with increase of the symptoms. The invention of the respirator has in a great measure obviated this inconvenience; and the phthisical patient, when warmly clad and furnished with this instrument, may be allowed to take exercise in the open air, not only with impunity, but with positive benefit. Among the medicines which have been employed in the general treatment of phthisis, emetics must be first mentioned. It is remarkable, says Dr. Young, that a very great majority of the cures of consumption related by different authors have either been performed by emetics or by decidedly nauseating remedies. It is evident that the effects of vomiting are general, and not confined to the stomach. The mechanical pressure upon the abdominal and thoracic viscera, the influence upon the arterial and venous circulations, the effects upon the nervous system, and the subsequent diaphoresis, all point out that the action of vomiting is general and complicated; and, associated with the benefits resulting from sea-voyages, swinging, &c., there is every reason to believe that the use of emetics in incipient cases of phthisis is satisfactorily demonstrated.

From the efficacy of bark, sarsaparilla, iron, and iodine, in scrophula and some other diseases attended with constitutional debility, it has been imagined that these medicines must necessarily prove beneficial in phthisis; and there can be no doubt that their tonic properties, when not contra-indicated by the existence of inflammation or much febrile excitement, may safely be put in requisition in the treatment of phthisis. Another class of remedies, of a totally different nature, but not less efficacious when judiciously applied, may be called anti-inflammatory. Such are bleeding, either general or local; mercury, digitalis, counter-irritation. The last is one of the most powerful therapeutic agents that we possess, and, like all other remedies, when used in the commencement of disease presents the greatest chance of success. It is inapplicable when much fever is present, and should never be carried to the extent of producing constitutional disturbance.

These are the general remedies employed in phthisis. The more prominent symptoms of the disease require to be combated by particular medicines which we have yet to name, or by a combination of those just enumerated. One of the most constant and harassing of the symptoms of consumption is cough, which, by interrupting sleep and accelerating the circulation, exerts an injurious influence over the general comfort and health of the patient. It may be tranquillised by the application of sinapisms, tartar emetic ointment, or stimulating plasters to the walls of the chest; or the direct local application of the vapours of chlorine and iodine to the internal surface of the bronchial tubes by means of inhalation may be tried. In addition to these measures, the cough may be calmed by mucilaginous mixtures, decoctions of Iceland moss, small doses of hyoscyamus, Prussic acid, opium, æther, &c. Perspirations in phthisis are very common, and when profuse, tend to weaken the patient. They are checked by exhibiting acids. The sulphuric acid given in bark, or the nitric acid in a decoction of sarsaparilla, are the most eligible combinations for combating this symptom. We have seen that the diarrhœa which takes place in phthisis is the result of inflammation and ulceration of the intestinal canal: a knowledge of this fact will at once regulate our treatment. All stimulating food and medicine must be avoided; the external surface of the body generally, and the abdomen in particular, should be kept warm; gentle counter-irritation may be made to the latter, and small doses of rhubarb and opium, chalk and opium, or lime-water and milk, may be given internally. With respect to the treatment of pneumonia and pleurisy, which are so frequent in the latter stages of phthisis, we cannot be too cautious. It must never be forgotten that they are mere complications; and in any depletory measures which may be thought necessary, the original disease upon which they are engrafted must not be lost sight of. On the whole, local bleeding by leeches or cupping is preferable to venesection, and counter-irritation to both. For a full account of hæmoptysis and its treatment, see Hæmoptysis.

PHULWA, or the *Vegetable Butter of Almora*, is the produce of the chooree, or butter-tree (Bassia butyracea of botanists) of Kumaon, in the eastern district of which it grows. It is peculiarly abundant in the adjoining Goorkhalee province of Dotee, where the butter forms an article of commerce. Hence, in its crude state, it is cheaper than ghee (clarified butter), and is used to adulterate that article. It answers well for lamps, burning with a bright flame, neither the smell nor the smoke being so great as is the case with oil; and Mr. Traill, who was commissioner in Kumaon, used it for this purpose in preference to cocoa-nut oil. This substance has been analyzed by Mr. E. Solly, who describes it as existing in the solid form at ordinary temperatures: at about 120° Fahr. it is perfectly melted, and appears then as a pale yellow oil. A specimen of the phulwa which was brought to this country five years previously was found to consist of sixty parts of solid oil, thirty-four of fluid oil, and six of vegetable impurities. See Bassia for a description of the tree; and *Proc. Com. of Commerce and Agriculture of Royal Asiatic Society*, 1839.

PHYLLA'STREPHUS, Mr. Swainson's name for a genus of *Merulidæ*, placed by him in his subfamily *Brachypodinæ*, or *Short-footed Thrushes*. For the generic character see the article Merulidæ [vol. xv., p. 121]. The name was given, as Mr. Swainson observes, in consequence of one of the species, according to Le Vaillant, loving to shelter and hunt among heaps of dead leaves. Mr. Swainson further remarks that, as yet, but two species are known, and these are from the African continent; the long straight bill of these, he adds, is continued to the genus *Micropus*, Sw. (*Classification of Birds*, vol. ii.)

PHYLLIDIANS, Lamarck's name for a family of *Gastropodous Mollusks*, including the genera *Phyllidia*, *Chitonellus*, *Chiton*, *Patella*, *Patelloidea*, and *Siphonaria*.

M. Deshayes, in the last edition of Lamarck, observes that zoologists are not agreed as to the nature and relations of the genera which Lamarck has collected in this family under the common character of having branchiæ placed circularly round the body between the foot and the mantle. In the first edition of the 'Règne Animal,' he remarks, Cuvier formed at the end of his *Gasteropoda* a small family under the name of *Cyclobranchians*, in which he places the Chitons and Limpets, whilst he arranges the family of *Inferobranchians*, containing the *Phyllidiæ* and *Diphyllidiæ*, at the commencement of the *Gastropods*. Nevertheless it may be said, with reference to the disposition of their branchiæ, that these last two genera are as much *Cyclobranchians* as the Limpets and Chitons; but, adds M. Deshayes, Cuvier doubtless found in the organization of these different mollusks sufficient reasons for separating them. M. de Férussac, in his systematic tables, preserved the two families of Cuvier in the same position, but converted them into orders. That of the *Inferobranchians* was augmented by the genus *Umbrella*, and the order of *Cyclobranchians* was divided into two families, the Limpets and the Chitons. M. de Blainville (*Malacologie*) proposed another distribution of the *Cyclobranchians* of Cuvier. The former zoologist retained the *Inferobranchians*, of which he formed an order towards the end of the *Monœcious Mollusks*; but considering the Chitons as a type intermediate between the *Mollusks* properly so called, and the *Cirrhipeds*, he made in his arrangement a subtype, under the name of *Malentozoaria*, for the assemblage of these two kinds of animals, dividing them into two classes, one of which, the *Polyplaxiphora*, was for the *Chitons*. With the exception of M. de Blainville, the opinions of other naturalists may be referred either to that of Cuvier or that of Lamarck. M. Deshayes says, in conclusion, that after having for a long time directed his special attention to this question, he thinks that the mollusks comprised by Lamarck in his family ought to be separated; for some, as *Chitonellus*, *Chiton*, and *Patella*, are hermaphrodites; others, the *Phyllidians* namely, are monœcious.*

PHYLLO'DIUM is that organ which in the greater part of the New Holland Acacias, or wattle-trees, stands in the place of leaves. When such plants are young, they are clothed with the pinnated leaves, characteristic of the Acacias of extra-Australian countries; but the leaflets soon drop off or cease to appear, and the petiole enlarges from a linear connection between the leaflets to a broad leafy expansion which presents one of its edges to the sky and the other to the earth. That expansion is the phyllodium, which is therefore a peculiar modification of the petiole, whose surface is extended in order to compensate for the diminution of respiratory and digestive power consequent upon the loss of the leaflets by which those functions would be otherwise performed.

PHYLLO'PODA, Latreille's name for a section of crustaceans which have the head confounded with the trunk; the eyes sessile, smooth, and closely approximated; a delicate buckler formed of a single piece, and free posteriorly, serving as a crust or shell; two horny demi-cylindrical mandibles, with a compressed, straight, and very dentilated point, but without palps; first pair of feet in the form of oars, and terminated by articulated bristle-like appendages; the others branchial, and more than sixty (pairs) in number, disposed for swimming.

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* Quære de hoc.

The genus *Apus* of Scopoli (*Binoculus*, Geoffr., Leach; *Limulus*, Mull., Lam.; *Monoculus*, Linn., Fabr.) will serve as an example of the *Phyllopoda*. [BINOCULUS. N.B. The printer has reversed the cut, and placed the tail uppermost.]

PHYLLOSO'MA. The family of *Double-cuirassed Crustaceans* (*Bicuirassés*), is composed of forms which are very remarkable for their rounded shape and the transparency of their teguments. The *carapace* is large, lamellar, extended like a leaf horizontally above the base of the antennæ and a more or less considerable portion of the thorax. The thorax is equally depressed, so as to resemble a thin blade or plate placed horizontally, and to the existence of these two bucklers, so to speak, they owe the name (*Bicuirassés*) given to them by Latreille. The ophthalmic ring is but little if at all distinct from the interior border of the carapace, and it is from this border also that the antennæ spring. The *eyes* are very large and projecting. The *antennæ* spring below and behind their peduncle, on the same transversal line, and are directed forwards; those of the first pair are bifid at the end, and the conformation of those of the second pair varies. The *mouth* is situated very far from the base of the antennæ, and is found towards the anterior third or the middle of the lower surface of the carapace; it has the form of a rounded tubercle, and is composed essentially of a large *upper lip*, a pair of hooked *mandibles* which want a palpiform stem, a membranous and bilobated *lower lip*, and a pair of jaws; sometimes there are to be found a second pair of jaws and even jaw-feet applied against the mouth, but in general those organs are rudimentary and thrown rather far backwards. The great flattened blade or plate, which constitutes the thorax, commences immediately behind the mouth, and presents no annular divisions; in general it reaches a good deal beyond the carapace, and gives insertion to the feet by its lateral borders, so that those organs are very distant from the median line. The number of feet consists of from seven to eight pairs, but those of the first pair, and, sometimes, those of the last, are very short, whilst the others are very long; all are very slender, and lead, towards a third of their length, to a large flabelliform appendage, which is analogous to the external branch of the thoracic feet of the *Mysians*, but which takes its origin much farther from the body. The *abdomen* is slender, and sometimes rudimentary; in general, nevertheless, it is terminated by a fin composed of five blades disposed in a fan-shape, as in the family of the *Caridoïds*. The false feet are always more or less rudimentary.

These crustaceans do not present any organs which can be considered as *branchiæ;* some naturalists give this name to the ciliated appendage which represents the palp of the thoracic feet, but without resting this conclusion on any fact; and M. Milne Edwards is disposed to believe that respiration is carried on by means of the general surface of the body. (*Histoire Naturelle des Crustacés.*)

M. Milne Edwards, whose definition of this family we have above given, makes it consist of two genera only, *Phyllosoma* and *Amphion*. He observes that the *Phyllosomata* are easily recognised by their foliaceous carapace, which leaves part of the thorax exposed. In *Amphion*, the carapace hides the thorax entirely.

Phyllosoma. (Leach.)

Generic Character.—This, one of the most remarkable genera known, is composed of animals whose body is so much flattened, that there is scarcely an interval between the teguments of the upper and lower surfaces, so that it is difficult to comprehend how the viscera are there lodged. This lamellar body is divided into three distinct parts; the head, the thorax, and the abdomen.

The *head* has the form of a delicate disk or of an ordinary oval leaf, and only adheres to the thorax by its central portion, so that the borders all round are free. This species of buckler is wide and horizontal; at its anterior extremity it gives insertion to the eyes and to the antennæ. The eyes spring near the median line, and are globular; they are carried on slender, cylindrical, and very long peduncles. The *internal antennæ* spring equally from the border of the carapace, immediately outside the ocular peduncles; they are very small, and present a peduncle composed of three cylindrical joints and two terminal filaments. The *second pair of antennæ* have their origin on the outside of the preceding, and vary much in their form: sometimes they are very long, slender, cylindrical, and composed of many distinct joints; at other times they are short, lamellar, without apparent divisions, and seem to be only prolongations of the carapace. The *mouth* is situated towards the middle or even towards the posterior third of the carapace, and is only composed of a labrum, a pair of mandibles, a lower lip, and a pair of jaws. The *mandibles* are large, rounded externally, and armed internally with two trenchant edges and a small tooth. The *lower lip* is large, very apparent, and deeply bilobated; the *jaws* are small, membranous, and each terminated by two lobes or blades directed inwards, and armed with some spines towards their summit. The appendages which represent the jaws of the second pair, and the first jaw-feet, are rudimentary, and do not enter into the composition of the buccal apparatus; they are thrown more or less far backwards, and fixed to the thoracic buckler like the feet. The jaws of the second pair are represented by a lamina or blade, which is sometimes rather large and oval, sometimes entirely rudimentary. A pair of tubercles, situated a little behind these last appendages, are the only vestiges of limbs, which ordinarily constitute the jaw-feet of the first pair.

The *thorax* is lamellar like the carapace, and constitutes a second buckler, the anterior portion of which only is covered by the first of these foliaceous disks. It is in general wider than it is long, and striated transversely, but it presents no trace of a division into rings. The *feet* are inserted all round the disk: the first pair are very small, and hidden under the carapace; they are slender, cylindrical, and unguiculated at the end; sometimes they are not furnished with appendages, sometimes they give origin from the extremity of their last joint to a flabelliform palp. The five or even six succeeding pairs are very long, and sufficiently similar to each other; like the first pair, they are cylindrical and very slender, and they each take their origin on a cylindrical prolongation of the border of the great thoracic plate. Their first joint is very long, and carries at its extremity a flagelliform palp, composed of a cylindrical joint, and of a multiarticulate stem furnished with numerous hairs. The succeeding joints of the principal branch of the feet present nothing remarkable, but are very easily detached, so that in general they are not found, and the feet appear to be terminated by a ciliated appendage. The first pair of feet end in a slender and elongated joint, while the four or five succeeding pairs are terminated by a rather strong nail; the last pair are sometimes similar to the preceding, sometimes rudimentary and without the flabelliform palp. At the base of the anterior feet, or even of all the organs, are found small vesicular appendages, which seem to be the vestiges of the flagrum (or external branch) of those members. The disposition of the abdomen varies: sometimes it is elongated, divided into very distinct rings, and perfectly distinct from the thorax which covers its base; sometimes it is confounded with the buckler, and only seems to be a prolongation of it. In this last case it varies still, for sometimes it is very wide at the base, and occupies the whole space comprised between the posterior feet; whilst in other cases it is rudimentary and lodged at the bottom of the re-entering angle formed by the border of the thoracic plate. Six or seven rings can nearly always be distinguished on it, the last of which forms, with the appendages of the succeeding segment, a more or less developed caudal fin. The number of the false feet fixed under the abdomen varies, and they are in general rudimentary. (M. Edwards.)

Nervous System and General Organization.—The nervous system of the *Phyllosomata* presents a remarkable mode of conformation; the mass formed by the cephalic ganglion is situated near the base of the antennæ, and communicates with the thoracic ganglions by means of two very long chords. The thoracic ganglions are not united on the median line, but communicate with each other by transversal commissures: there are nine pairs. The abdominal ganglions are very small, and amount to six pairs. The intestine seems to be straight, and in the interior of the cephalic buckler are to be perceived a great number of vessels which diverge laterally. M. Milne Edwards observes that M. Guerin thinks that these vessels may belong to the circulatory apparatus; but this opinion does not appear to M. Milne Edwards to be admissible, and he considers that this apparatus is the analogue of the liver. He acknowledges that he knows nothing of the organs of reproduction in these crustaceans, and adds, that their habits have not been studied.

Geographical Distribution of the Genus.—The seas of warm countries. M. Milne Edwards remarks, that were it not for the beautiful blue of their eyes, they would not be perceived as they float on the surface of the water, so transparent are their bodies. The seas of Africa and India, New Holland and New Guinea, furnish the greatest number of species. *Phyllosoma Mediterranea* appears to have been the only European species known, till Mr. F. C. Lukis noticed another of these remarkable crustaceans in the 8th volume of Loudon's *Magazine of Nat. Hist.* The figure in Loudon is very correct, but Mr. Lukis has called our attention to a slight mistake in the position of the letters of indication. Letter *a* in the note at the foot is made to point to the ventral aspect, whereas it should indicate the *dorsal*, which in the description is assigned to letter *b*: but this last letter, in the cut, indicates the ventral aspect. Since the publication in Loudon, Mr. Lukis has confirmed the presence of the species on the shores of the Atlantic by another specimen taken at Guernsey, and he proposes for it the name of *Phyllosoma Sarniense.*

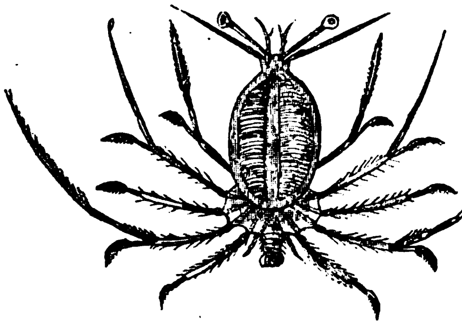
The species are very numerous, and exhibit differences in their organization so great, that M. Milne Edwards thinks it will be probably necessary hereafter to establish many generic divisions for these forms; but, as he cautiously and philosophically observes, until the modifications of structure dependent upon sex and age are known, the value of those differences cannot be well appreciated: he therefore thinks it preferable to take those differences only for the base of simple subgenera, and he divides the genus into the three following natural groups:—

1.
Ordinary Phyllosomata.

Abdomen very distinct from the thorax, large, divided into rings, and terminated by a well-developed caudal fin.

The *Phyllosomata* of this division, in the opinion of M. Milne Edwards, approach, more than the others, the *Caridoïds* and the *Amphions*, for their abdomen, though flattened, much resembles that of the Shrimps (*Salicoques*). The cephalic buckler is oval and very much elongated. The external antennæ are setaceous, very long, in general divided into many joints and without a dilatation of an auricular form at their base. The two first pairs of feet, which correspond to the jaw-feet of the second and third pair in the Decapods, carry a flabelliform palp. The thoracic plate is nearly circular, and its lower part is narrow and but little or not at all notched. The posterior feet are rudimentary. The abdomen is rather large, not much narrowed backwards, composed of very distinct rings, and is terminated by a caudal fin, the four lateral blades of which are nearly as long as the middle blade.

Example, *Phyllosoma commune.*

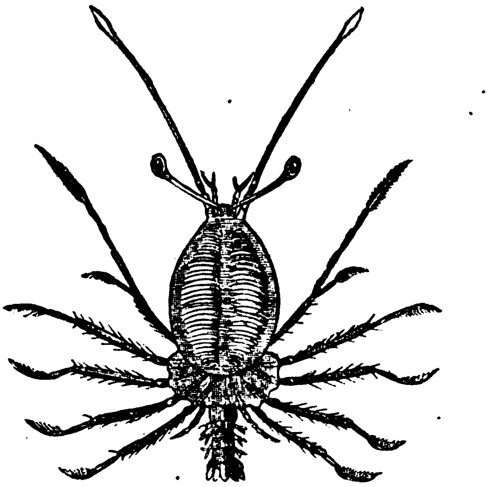


Phyllosoma commune.

Description.—Cephalic plate less than the thoracic plate, covering the base of the second pair of feet (or external jaw-feet), elongated, and narrowed forwards. External antennæ styliform, much longer than the ocular peduncles, and composed of five joints (without reckoning the peduncle which supports them, and which is only a prolongation of the border of the carapace), of which the third is very small, the fourth shorter than the ocular peduncle, and the last nearly half the length of the preceding, and not convex. Mouth situated towards the posterior third of the carapace, and very near the jaws of the second pair, which have the form of large oval blades. Jaw-feet represented by a small ciliated appendage carried on a large tubercle. Anterior feet (or jaw-feet of the second pair) reaching beyond the mouth, and having at their base, as well as at the base of the succeeding feet, a small vesicle. Abdomen scarce more than one-half as long as the thorax. Length about an inch.

Locality.—The seas of Africa and India.

Phyllosoma clavicorne, from the seas of Africa and Asia, is another example of this section.



Phyllosoma clavicorne.

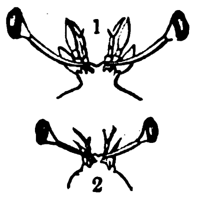
The other two sections consist of those *Phyllosomata* whose abdomen is intimately united with the thorax, without well distinguished divisions, and terminated by a very small caudal fin.

2.
Short-tailed Phyllosomata.

Abdomen in general rudimentary and lodged in the middle of a great notch on the posterior border of the thorax.

In this group the abdomen presents nearly the same form as in the *ordinary Phyllosomata*, but is in general nearly rudimentary, and is always lodged in the middle of a re-entering angle formed by the posterior border of the thoracic plate; the false feet are ordinarily reduced to the state of vestiges, and the caudal fin is in general very incomplete. The conformation of the external antennæ is equally characteristic; these appendages are shorter than the internal antennæ, and have the form of a blade without transversal divisions, which presents externally an articuliform prolongation or point, and which itself seems to be a simple prolongation of the border. The anterior jaw-feet are nearly always reduced to a state still more rudimentary than they are in the *ordinary Phyllosomata*, and the feet of the two first pair want the flagelliform palp.

Phyllosoma laticorne and *Phyllosoma brevicorne*, the eyes and antennæ of which are represented below, are examples of this section.



1, eyes and antennæ of Phyllosoma laticorne; 2, eyes and antennæ of Phyllosoma brevicorne. The first of these species is found in the Indian seas, and the second in the seas of Africa and Asia.

3.
Broad-tailed Phyllosomata.

Abdomen large, triangular, and occupying the whole length of the posterior border of the carapace.

The *Phyllosomata* of this division are remarkable for the great size of their carapace, and especially for the conformation of their abdomen, which is triangular, occupies the whole space comprised between the base of the posterior feet, and continues with the thorax without interruption, so as to form with it a single plate. The external antennæ are short, lamellar, and furnished externally with an articuliform prolongation, as in the preceding section. The disposition of the external jaw-feet and of the anterior jaw-feet is the same as in the *ordinary Phyllosomata*, whilst the feet of the two first pairs want the flabelliform palp, as in the *Short-tailed Phyllosomata*. The posterior feet are rudimentary. The abdomen is terminated by a fin consisting of five rather large blades; but the false feet of the preceding rings are rudimentary.

Phyllosoma spinosum (Azores) and *Phyllosoma Mediterraneum* (Mediterranean), &c., are examples of this section.

Amphion. (M. Edwards.)

M. Milne Edwards states that the *crustacea* which he has designated under the name of *Amphion* approach nearer to the *Phyllosomata* than any of the other *Stomapods*, but in some respects they resemble also the genera *Alima* and *Mysis*, and he is of opinion that they establish the natural passage between these animals. Their cephalic buckler or carapace is foliaceous, like that of the *Phyllosomata*, whilst the form of the abdomen and the caudal fin is that of *Mysis*.

The *cephalic buckler* is very much developed and entirely lamellar; it extends to the origin of the abdomen and hides the base of the feet; its longitudinal diameter is more than twice its transversal diameter, and on each side it is curved a little downwards; its anterior border is nearly straight, and leaves exposed the ring which carries the eyes. There is no trace of a rostrum, but on each side the angle formed by the union of this border with the lateral border is prolonged forwards after the fashion of a spine. The posterior border of the carapace, which is short and nearly straight, is continued with the lateral borders without forming well marked angles. The eyes are very large; their terminal portion has the same form as that of the *Phyllosomata*, but the narrow stem which supports them, instead of being very long, as in those crustaceans, is extremely short. The four *antennæ* are inserted on the same line, immediately below and behind the ocular peduncles. The first pair have the same general form as in the *Phyllosomata;* their basilary portion is composed of three slender and cylindrical joints, the first and last of which are the longest, and they each terminate by two small filiform stems, the internal one very short, and the external one nearly of the length of the basilary portion. The external antennæ are much more developed, and do not at all resemble those of the *Phyllosomata;* they approximate much in their general form to those of the *Alimæ*, but, instead of being directed downwards and outwards, they are straight and directed forwards. Their first joint, which is not very distinct, gives insertion internally to a cylindrical stem, and externally to a great lamellar appendage; this lamina, which is nearly oval, goes much beyond the edge of the basilary portion of the internal antennæ; its internal and anterior borders are ciliated, and its external border is terminated by a spine. The stem is composed of two small very short basilary joints, and of a long terminal joint slightly convex towards the end; its length is almost double that of the lamina which covers its base.

The disposition of the mouth is nearly the same as in the *Phyllosomata;* it is very distant from the antennæ, and forms towards the anterior third of the cephalic buckler a small rounded tubercle, from the posterior part of which the thorax springs. The parts which enter into its composition are a labrum, two mandibles, a tounglet (languette), two pairs of jaws, and two pairs of jaw-feet. The *labrum* is transversal and but little developed. The *mandibles* carry no palp, and are in great part hidden by the tounglet, which is bilobated. The *jaws* (first pair) are nearly rudimentary, and appeared to M. Milne Edwards to consist only of a small horny blade, the border of which is ciliated. The second pair are composed of two joints, the first of which presents internally a prolongation furnished with spines. The *jaw-feet* of the first and second pair, which in the *Phyllosomata* exist only in the state of vestiges and do not enter into the composition of the buccal apparatus, are, on the contrary, here very much developed and applied upon the jaws. Those of the first pair present within many tounglets furnished with hairs at their extremities, and on the external side of their base with a large foliaceous and oval appendage. The jaw-feet of the second pair are much more developed than the preceding; their basilary joint is lamellar, and carries on its anterior part, 1st, a cylindrical stem composed of three joints; 2nd, a flabelliform appendage, or a species of palp, which advances to the external side of the stem and reaches beyond it. The *thorax* is flattened, as in the *Phyllosomata*, but narrower, and completely hidden under the carapace: it gives attachment to six pairs of feet having the same disposition as in those crustaceans; the whole are slender and cylindrical, and at the extremity of their second joint springs a palpiform appendage, composed of a cylindrical joint terminated by a multiarticulated and ciliated bristle. The first pair of feet, those which correspond to the external jaw-feet of the *Decapods*, are inserted very far from the mouth, and are much shorter than the others; their second joint is terminated forwards by a sharp spine. The three succeeding pairs of feet become longer and longer, and have at the edge of their third joint one, two, or three spines, similar to that which exists at the extremity of the second joint. The fifth pair of feet, which are rather shorter than the fourth pair, present the same disposition; the last pair are much shorter than the preceding, and present no very distinct spines. The *abdomen* is nearly as long as the cephalo-thoracic portion of the body, and is composed of seven segments. Its form is the same as that of the abdomen of the *Salicoques*, and terminates by a fan-shaped fin, the median piece of which (formed by the seventh ring) is lanceolate, and the lateral pieces of which are oval. The appendages fixed under the first five rings of the abdomen are rudimentary.

The only species known, *Amphion Reynaudii*, was taken at sea in the Indian Ocean by M. Reynaud, naval surgeon. Its length is about an inch, and its teguments, with the exception of those of the abdomen, are diaphonous. (*Histoire Naturelle des Crustacés.*)

PHYSA. [LIMNEANS, vol. xiii., p. 409.]

PHY'SALUS. [PHYSOGRADA.]

PHYSE'TER. [WHALES.]

PHYSIC NUT, the colonial name of the nut of the Jatropha Curcas, an East Indian plant, whose seeds are employed by the natives as a purgative. It is common on the coast of Coromandel, where it forms a small tree or bush, and is called Baghbarinda. The seeds are violently emetic and drastic, in large doses energetic poisons; one seed is sufficient for a dose. The oil of the plant boiled with oxide of iron forms a varnish, used by the Chinese for covering boxes. (Lindley's *Flora Medica*, No. 375, p. 184.)

PHYSICIAN (ὁ φυσικός), a word derived from φύσις, *nature*, which meant originally what we should now call a *natural philosopher*, or one of those persons who have for their object the investigation of nature and its laws, in opposition to οἱ ἠθικοί, or those who examine particularly into the moral nature of men. [PHILOSOPHY.] In English however the word *physician* is used only to designate the professors of the healing art, called in Greek ἰατροί, and in Latin *medici;* while in most (if not all) other European languages the derivatives of the Greek word are still employed in their original meaning, and the idea of *healing* is expressed either by some native word or by one derived from the Latin.[*] The origin and progress of physic, together with an account of the different medical sects, has been given already under MEDICINE; in the present article it is proposed to mention some of the most curious and interesting facts respecting the rank, education, &c. of the physicians of antiquity, and afterwards to state the legal qualifications for practising this branch of the medical profession in our own country.

In Greece and Asia Minor the profession of medicine seems to have been held in high esteem, for, not to mention the apotheosis of Æsculapius, who was considered as the father of it, there was a law at Athens that no female or *slave* should practise it (Hyginus, *Fab.*, cap. 274); Ælian mentions one of the laws of Zaleucus among the Epizephyrian Locrians, by which it was ordered that if any one during his illness should drink wine contrary to the orders of his physician, even if he should recover, he should be put to death for his disobedience (*Var. Hist.*, lib. ii., cap. 37); and there are extant several medals struck by the people of Smyrna in honour of different persons belonging to the medical profession. (Mead's *Dissertatio de Nummis quibusdam à Smyrnæis in Medicorum Honorem percussis*, 4to., Lond.,

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[*] Somewhat analogous to this is the use of the Arabic word *hakim* (from *hakama*, 'novit,' 'sapiens fuit'), which properly means *a wise* or *learned man* in general, but is very frequently used in a restricted sense to signify *a physician*.

1724.) If the Decree of the Athenians (published among the letters of Hippocrates) be genuine, and if Soranus (*in Vitâ Hippocr.*) can be depended on, the same honours were conferred upon that physician as had before been given to Hercules; he was voted a golden crown, publicly initiated into the Eleusinian mysteries, and maintained in the Prytaneum at the state's expense. (See also Pliny, *Hist. Nat.*, lib. vii., cap. 37.) Some idea of the income of a physician in those times may be formed from the fact mentioned by Herodotus (lib. iii., cap. 131), that the Æginetans (about the year B.C. 532, Ol. 62, 1) paid Democedes from the public treasury one talent per annum for his services, *i.e.* (if we reckon, with Hussey, *Antient Weights and Money, &c.*, the Æginetan drachma to be worth 1*s.* 1¾*d.*) not quite three hundred and forty-four pounds; he afterwards received from the Athenians one hundred minæ, *i.e.* (reckoning, with Hussey, the Attic drachma to be worth 9¾*d.*) rather more than four hundred and six pounds; and he was finally attracted to Samos by being offered by Polycrates a salary of two talents, *i.e.* (if the Attic standard be meant) four hundred and eighty-seven pounds, ten shillings. It should however be added that Valckenaer doubts the accuracy of this statement of Herodotus with respect to the Æginetans and Athenians (and apparently with reason), on the ground that the latter people, at the time of their greatest wealth, only allowed their ambassadors two drachmæ (or 1*s.* 7½*d.*) per day, *i.e.* somewhat less than thirty pounds per annum. (Aristoph., *Acharn.*, v. 66.) It seems to have been not uncommon in those times (as afterwards in the later Roman empire, see ARCHIATER), for states to maintain physicians, who were paid at the public cost (Xenophon, *Memor. Socr.*, lib. iv., cap. 2, § 5; Plato, *Gorg.*, § 23; Strabo, lib. iv., p. 125; Diod. Sic., lib. xii., cap. 13); and these again had attendants, for the most part slaves, who exercised their calling among people of low condition. (Plato, *De Leg.*, lib. iv., p. 720, ed. Steph.; Boeckh's *Public Econ. of Athens*, vol. i., p. 160.)

In the earlier times of the Roman republic physicians were unknown (Pliny, *Hist. Nat.*, lib. xxix., cap. 5, ed. Tauchn.); and for some time afterwards the exercise of the profession was in a great measure confined to persons of servile rank; for the richer families having slaves who were skilled in all sorts of trades, &c., generally possessed one or more that understood medicine and surgery. (Middleton's Essay *De Medicorum apud Romanos degentium Conditione*, Cantab., 1726, 4to., and the various answers to it that appeared on its publication.) To this practice however there were many exceptions: *e.g.* the physician who was taken prisoner with Julius Cæsar by the pirates at the island of Pharmacusa (Sueton., cap. 4), and who is called his friend by Plutarch (see Casaubon's Note on Sueton.); Archagathus, who, being the first foreign surgeon that settled at Rome, had a shop bought for him at the public expense, and was presented with the Jus Quiritium, A.U.C. 535, B.C. 219 (Cassius Hemina ap. Pliny, *Hist. Nat.*, lib. xxix., cap. 6); Artorius, who is known to have been a physician (Cæl. Aurel., *De Morb. Acut.*, lib. iii., cap. 14, p. 224), and who is called the friend of Augustus (Plutarch, *Vita Bruti*, cap. 41, ed. Tauchn., where however it should be noticed that some editions read 'Αντώνιος instead of 'Αρτώριος); Asclapo, whom Cicero calls his friend (*Epist. ad Divers.*, lib. xiii., ep. 20); Asclepiades, the friend of Crassus the orator (Cic. *de Orat.*, lib. i., cap. 14); Eudemus, who is called by Tacitus (*Annal.*, lib. iv., cap. 3) the friend and physician of Livia; and others. With respect to the income made by eminent physicians at the beginning of the Roman empire, we learn from Pliny (*Hist. Nat.*, lib. xxix., cap. 5) that Albutius, Arruntius, Calpetanus, Cassius, and Rubrius gained two hundred and fifty thousand sesterces per annum, *i.e.* (reckoning with Hussey the mille nummi (*sestertium*) to be worth, before the reign of Augustus, 8*l.* 17*s.* 1*d.*) about two thousand two hundred and thirteen pounds, ten shillings; that Quintus Stertinius made it a favour that he was content to receive from the emperor five hundred thousand sesterces per annum (or rather more than four thousand four hundred and twenty-seven pounds), as he might have made six hundred thousand sesterces (or five thousand three hundred and twelve pounds, ten shillings) by his private practice; and that he and his brother, who received the same annual income from the emperor Claudius, left between them at their death, notwithstanding large sums that they had spent in beautifying the city of Naples, the sum of thirty millions of sesterces (or two hundred and sixty-five thousand six hundred and twenty-five pounds). Of the previous medical education necessary to qualify a physician for the legal practice of his profession in the early times, we know nothing; afterwards however this was under the superintendence of the Archiatri. [ARCHIATER.]

Among the Arabians the medical profession appears to have been held in high esteem. Many of their chief physicians were Jews or Christians, and some apostatised to Mohammedanism: in some families the profession would seem to have been in a manner hereditary, as in that of Avenzoar (*Ibn Zohir*), five of whom successively belonged to it. (Reiske's *Abulfedæ Annal. Moslem.*, tom. iv., p. 669.) The qualifications necessary for practising medicine seem to have been rather slight, till the Caliph Moctader, A.H. 319 (A.D. 931), in consequence of an ignorant practitioner's having killed one of his patients, passed a law that no one should be allowed to practise until he had been licensed to do so by the chief physician. (Casiri, *Biblioth. Arabico-Hisp. Escur.*, tom. i., p. 438.) Some idea of the consideration in which the Arabic and Moorish physicians were held may be gained from the fact that Sancho the Fat, king of Leon, was obliged to go in person to Cordova, A.D. 956 (A.H. 345), to be cured of an illness. (Mariana, l. viii., c. 7, tom. i., p. 318; Conde, *Domin. des Arabes, &c.*, t. i., p. 448.)

The first medical school that was established in Europe was that at Salerno (Salernitana Schola) towards the end of the seventh century; the second was probably that at Montpelier, founded about a hundred years afterwards. their course of medical education is unknown, but they doubtless exercised a most beneficial influence on the acquirements, and therefore on the personal rank and consideration of the physicians of the age. For a long time however the profession of medicine was almost entirely confined to the clergy, who indeed were the only persons in those days that possessed any share of learning. Surgery was however given up to the laity, as the clergy were prohibited from undertaking any bloody operation.

Hence arose the distinction of the three regular orders of the medical profession, viz. physicians, surgeons, and apothecaries; and it is to the first of these exclusively that the remainder of this article will be dedicated. The degree of bachelor of physic seems to have been known at Oxford soon after the Conquest; and in the fourteenth century we find that the degree of doctor of physic was by no means uncommon. (Wood's *Hist. of Oxford*, vol. ii., p. 765, ed. Gutch; Chaucer's *Doctor of Physic's Tale.*) The English colleges could not of their own authority prevent any from undertaking to practise, though they had not obtained a degree in physic. On this account therefore, in the ninth year of the reign of Henry V., 1422, our universities proposed that an act of parliament should be passed ordering that 'No one shall use the mystery of physic unless he hath studied it in some university, and is at least a bachelor in that science. The sheriff shall inquire if any one practises in his county contrary to this regulation; and if any one so practise, he shall forfeit forty pounds and be imprisoned: and any woman who shall practise physic shall incur the same penalty.' (Quoted in Willcock, *On the Laws of the Medical Profession*, part ii., p. iii.)

This measure had not however the desired effect; indeed there appears to be some doubt whether it ever obtained the force of an act of parliament, on account of its being referred to the privy council for confirmation. In the third year of the reign of Henry VIII., 1511, was passed an act, which is generally received as the first operative law on the subject, and which takes no notice of the supposed statute of Henry V. By this, which is especially aimed against the sorcerers, witches, and smiths, 'who can no letters on the book,' it is enacted 'that no person within the city of London, nor within seven miles of the same, take upon him to exercise or occupy as a physician, except he be first examined, approved, and admitted by the bishop of London, or by the dean of St. Paul's, for the time being, calling to him or them four doctors of physic; upon the pain of forfeiture, for every month that they do occupy as physicians not admitted nor examined after the tenour of this act, of five pounds,' &c., &c. After making the same enactment for the different counties, the act goes on to say, 'Provided always, that this act nor anything therein contained be prejudicial to the universities of Oxford and Cambridge, or either of them, or to any privileges granted to them.' (Willcock, pp. 6, 7; Goodall's *Hist. of the Col. of Physicians*, p. 1-3.)

In the fourteenth year of the same reign, 1522, another act was passed, by which the examination of physicians was taken from the persons appointed for that purpose by the former statute, and reposed in the college instituted by a charter of that king. [PHYSICIANS, COLLEGE OF.] Under this the university graduates who might desire to practise in London were included, as well as the other physicians; and since that time the legislature has seldom interfered on the subject.

With respect to the present state of the profession, the first class of medical practitioners in rank and legal pre-eminence is that of the physicians. They are (by statute 32 Henry VIII.) allowed to practise physic in all its branches, among which surgery is enumerated. The law therefore permits them both to prescribe and compound their medicines, and to perform operations in surgery as well as to superintend them. These privileges are also reserved to them by the statutes and charters relating to the surgeons and the apothecaries. [SURGEON.] Yet custom has more decidedly distinguished the classes of the profession, and assigned to each its peculiar avocations. The practice of the physician is universally understood, as well by their college as the public, to be properly confined to the prescribing of medicines, which are to be compounded by the apothecaries; and in so far superintending the proceedings of the surgeon as to aid his operations by prescribing what is necessary to the general health of the patient, and for the purpose of counteracting any internal disease. It would be impossible to enumerate here the legal qualifications required by all the different European universities; it will therefore be sufficient to mention those recognised in the British dominions.

In the university of Oxford, for the degree of Bachelor of Medicine, it is necessary that the candidate should have completed twenty-eight terms from the day of matriculation; that he should have gone through the two examinations required for the degree of bachelor of arts; that he should have spent at least three years in the study of his profession; and that he should be examined by the Regius Professor of medicine and two other examiners of the degree of M.D. in the theory and practice of medicine, anatomy, physiology, and pathology; in materia medica, as well as chemistry and botany, so far as they illustrate the science of medicine; and in two at least of the following antient medical writers, viz. Hippocrates, Celsus, Aretæus, and Galen. After taking the degree of Bachelor of Medicine, the following licence to practise is delivered to the candidate, under the common seal of the university:—'Cancellarius, Magistri, et Scholares Universitatis Oxoniensis dilecto nobis in Christo, ——— Baccalaureo in Medicinâ, è Collegio ——— intra Universitatem prædictam, salutem in Domino sempiternam. Cum omnia nostra studia, consilia, et actiones ad Dei gloriam et fratrum salutem referri debeant; cumque Medicina ad hæc, inter reliquas facultates, plurimum conferat; hinc est, quòd nos 'Cancellarius, Magistri, et Scholares antedicti (pro eâ opinione, quam de scientiâ tuâ, vitæque ac morum integritate, habemus) liberam tibi, tenore præsentium, concedimus potestatem et facultatem practicandi in Medicinâ, et ea omnia faciendi, quæ ad eam spectant facultatem, ubivis per universum Angliæ regnum, in perpetuum duraturam. Nos etiam Cancellarius, Magistri, et Scholares antedicti, testamur præfatum juramentum de primatu Regiæ Majestatis suscepisse, tam omnibus Articulis Fidei et Religionis in Ecclesiâ Anglicanâ receptis et approbatis, quàm tribus illis Articulis comprehensis in Canone tricesimo sexto Libri Constitutionum et Canonum Ecclesiasticorum, editorum in Synodo Londini cœptâ 1603, et regni Domini nostri Jacobi, &c. primo.

'In quorum omnium majorem fidem et plenius testimonium, sigillum Universitatis Oxoniensis commune, quo hâc in parte utimur, præsentibus apponi fecimus. Datum in Domo nostræ Congregationis, die — mensis — anno Domini millesimo octingentesimo ——.'

For the degree of Doctor of Medicine, the candidate is required to have completed forty terms from the day of matriculation; and to recite publicly in the schools a dissertation upon some subject, to be approved by the Regius Professor, to whom a copy of it is afterwards to be presented.

At Cambridge a student, before he can proceed to the degree of Bachelor of Medicine, must have entered on his sixth year, have resided nine terms, and have passed the previous examination: the necessary certificates, &c. are much the same as those required at Oxford. A Doctor of Medicine must be of five years' standing from the degree of M.B.

Since the university of London has been chartered, in 1837, the degrees of Bachelor and Doctor of Medicine, among others, have been conferred there. Some temporary regulations have been drawn up, which are to continue in force until the year 1842; after that time the following are to be the necessary qualifications for medical degrees:—

For the degree of Bachelor of Medicine.—Candidates to have been engaged for four years in professional study at one or more of the recognised institutions, one year at least to be spent at a recognised institution or school in the United Kingdom. They have also to pass two examinations, at the first of which they must produce certificates of having completed the nineteenth year; of having taken a degree in arts in this university, or in a recognised university, or of having passed the matriculation examination; of having been student for two years at one or more recognised medical institutions, subsequently to having taken a degree in arts: of having attended a course of lectures on descriptive and surgical anatomy, general anatomy and physiology, comparative anatomy, pathological anatomy, chemistry, botany, materia medica and pharmacy, general pathology, general therapeutics, forensic medicine, hygiene, midwifery, surgery, medicine; of having dissected during nine months; of having attended a course of practical chemistry; and of having attended practical pharmacy. Candidates to be examined in anatomy, physiology, chemistry, structural and physiological botany, materia medica, and pharmacy.

To the second examination no candidate can be admitted until two years after passing the first. He must produce certificates of having passed his first examination; of having subsequently attended a course of lectures on each of two out of the four subjects mentioned above; of having subsequently to his first examination dissected for six months; of having conducted at least six labours; of having attended the surgical practice of a recognised hospital or hospitals during twelve months, and lectures on clinical surgery; of having attended the medical practice of a recognised hospital or hospitals during other twelve months, and lectures on clinical medicine; of having subsequently attended to practical medicine in a recognised hospital, infirmary, or dispensary, during six months. The candidate must also produce a certificate of moral character from a teacher in the last school at which he has studied. Candidates to be examined in physiology (including comparative anatomy), general pathology, general therapeutics, hygiene, surgery, medicine, midwifery, and forensic medicine.

For the degree of M.D.—Candidates to produce certificates: 1, of having taken the degree of Bachelor of Medicine in this university, or a degree in medicine or surgery at a university recognised by this university; 2, of having subsequently attended (A) to clinical or practical medicine during two years in a recognised hospital or medical institution; (B) or to clinical or practical medicine during one year in a recognised hospital or medical institution, and of having been engaged during three years in the practice of his profession; (C) or if he have taken the degree of B.M. in this university, of having been engaged during five years in the practice of his profession; 3, of moral character, signed by two persons of respectability.

Candidates who have not taken a degree in arts, or passed the matriculation examination in this university, will be required to translate a portion of Celsus *De Re Medicâ*.

Regulations relating to Practitioners in Medicine or Surgery desirous of obtaining degrees in Medicine.

Degree of Bachelor of Medicine.—Candidates shall be admitted to the two examinations for the degree of Bachelor of Medicine on producing certificates:—1, of having been admitted, prior to the year 1840, members of one of the legally constituted bodies in the United Kingdom for licensing practitioners in medicine or surgery; 2, of having received a part of their education at a recognised institution or school, as required by the charter of the university; 3, of moral character, signed by two persons of respectability.

Degree of Doctor of Medicine.—Candidates who have been engaged during five years in the practice of their profession, shall be admitted to the examination for this degree on producing certificates:—1, of having been engaged during five years in the practice of their profession; 2, of having taken the degree of Bachelor of Medicine in this university.

In Scotland the degree of doctor of medicine is conferred by the universities of Edinburgh, Glasgow, Aberdeen, and St. Andrews, from which last named university a diploma can still be obtained without residence; the regulations at the others contain nothing particularly worthy of notice.

In Ireland, the King and Queen's College of Physicians exercise much the same jurisdiction as the English college. The degrees of Bachelor and Doctor of Medicine conferred by Trinity College, Dublin, rank with the same degrees respectively from Oxford and Cambridge, and are never given without previous study in arts, which occupies four years. For the degree of M.D. five years must have elapsed since the degree of M.B. was conferred; the candidate is then to undergo a second examination, and write and publish a Latin thesis on some medical subject.

By the English law the physician is exempted from serving on juries, from serving various offices, and from bearing arms. He is (according to Willcock, p. 105) responsible for want of skill or attention, and is liable to make compensation in pecuniary damages (as far as such can be deemed a compensation) to any of his patients who may have suffered injury by any gross want of professional knowledge on his part.

Some idea of the amount of fees paid to physicians in the middle ages may be gained by what we are told of Petrus de Abano, one of the most eminent physicians of the thirteenth century. For visiting a patient out of his own city he charged one hundred and fifty francs (or about six pounds) per day; and that when sent for by Pope Honorius IV., he demanded four hundred ducats per day, or about seventy pounds. (Bayle's *Dict.*, art. 'Apone.') It should however be noticed that these charges were considered very enormous.

In England physicians were frequently rewarded by the grant of church livings, prebendaries, and deanaries; and the names of some are preserved who were made bishops. At present it is determined by law that the fee of a physician is honorary, and that it cannot be recovered by an action at law; and that every person professing to act as a physician is precluded from assuming a different character, as that of a surgeon or apothecary, for the purpose of recovering his fees, although he may in fact be a surgeon or apothecary, or a person who had no right to practise as a physician. It has likewise been determined that a custom in the defendant's neighbourhood to pay physicians at a certain rate is immaterial, and gives them no greater right to bring the action than in places where no such custom is known. (Willcock, p. 3.) A physician however of great eminence may be considered reasonably entitled to a larger recompense than one who has not equal practice, after it has become publicly understood that he expects a larger fee; inasmuch as the party applying to him must be taken to have employed him with a knowledge of this circumstance. (*Ibid.*)

PHYSICIANS, ROYAL COLLEGE OF, the principal chartered medical body in England, was founded through the instrumentality of Linacre, who obtained, by his interest with Cardinal Wolsey, letters patent from Henry VIII., dated in the year 1518. This charter granted to John Chambre, Thomas Linacre, Ferdinand de Victoria, Nicholas Halsewell, John Francis, and Robert Yaxley, that they, and all men of the same faculty of and in the city of London, should be in fact and name one body and perpetual community or college; and that the same community or college might yearly and for ever elect and make some prudent man of that community expert in the faculty of medicine, president of the same college or community, to supervise, observe, and govern for that year the said college or community, and all men of the same faculty, and their affairs, and also that the president and college of the same community might elect four every year, who should have the supervision and scrutiny, &c. of all physicians within the precinct of London. The statute (14 Henry VIII.) confirmed this charter, and further ordained that the six persons above named, choosing to themselves two more of the said commonalty, should from henceforth be called and cleaped elects; and that the same elects should yearly choose one of them to be president of the said commonalty; and then provided for the election of others to supply the rooms and places of such elects as should in future be void by death or otherwise, which was to be made by the survivors of the same elects. The statute (32 Henry VIII.) provides that from thenceforth the President, Commons, and Fellows might yearly, at such time as they should think fit, elect and choose four persons of the said Commons and Fellows, of the best learned, wisest, and most discreet, such as they should think convenient, and have experience in the faculty of physic, to search and examine apothecaries' wares, &c. This last appointment is independent of the constitution of the body, the persons so appointed being officers for a special purpose; and it has been usual to select for this office the same four persons in whom the government of the physicians is reposed by the charter and statute of the 14th of that king.

The constituted officers then of this corporation are the eight elects, of whom one is to be president, and four governors, who have generally born the name of censors. There is nothing to be gathered from the charter or statutes in any way tending to exclude any of the elects, except the president, from the office of censor; and as no duties are assigned to the elects, except those of filling up their own number, electing one of themselves to be president, and granting testimonials to country practitioners, they may be rather regarded as candidates for the office of president than as active officers of the corporation. The college is bound to choose four censors, for the purpose of discharging the duties confided in it, which are to be executed by these officers. It is also incumbent on the elects to preserve their number, so that there may at no time be less than five, including the president, as they would not, after a further reduction, be capable either of electing a president or choosing others to fill the vacancies in their own body. (Willcock *On the Laws of the Medical Profession*, p. 32.) It is evident that the charter so far incorporated all persons of the same faculty, of and near London, that every person on the 23rd of September, in the 10th year of the reign of Henry VIII., falling within that description, was entitled to be admitted into the association. Such of them as had availed themselves of this privilege, and others subsequently admitted, are the persons described by statute 32 Henry VIII., as 'Commons and Fellows' (quoted in Willcock, p. 13). But as to the persons who should afterwards enjoy that distinction, the original charter and all subsequent statutes are silent. James I. and Charles II. granted charters to this body. The first is silent as to the mode of continuing it; but the charter of Charles, after limiting the number of fellows to forty, directed that when a vacancy should occur in that number, the remainder should elect one of the most learned and able persons skilled and experienced in physic, then of the commonalty of members of the college. Each of these charters seems to have been granted with a view to the enactment of a bill to the same effect, as the kings respectively pledged themselves to give it the royal assent. No statute has been at any time passed in pursuance of this purpose; and it is very doubtful how far and in what manner the charters have been accepted by the college, though they have certainly been several times acted upon. (Willcock, p. 34.)

The licentiates of the college who may practise within the precincts of London and seven miles round it were (until 1836) of three orders, viz. Fellows, Candidates, and mere Licentiates. The last of these classes, generally denominated licentiates, are those who have only a licence to practise physic within the precincts above described. The second class was abolished in 1836. The first class are those who have received that licence, but whose licence also shows that they are admitted to the order of fellows. This licence has often been called a *diploma*, but as it confers no degrees, the word is not properly applied, according to its more strict signification

The order of Licentiates was created by the following clause of the charter of Henry VIII.:—'We have granted also to the same President and College or Community, and their successors, that no one within the said city or within seven miles around it may practise in the said faculty until admitted to this by the said President and Community, or their successors for the time being, by the letters of the same President and College, sealed with their common seal, under the penalty of one hundred shillings for every month for which, unadmitted, he may have practised in the same faculty, half to be applied for us and our heirs, and half for the same President and College.' Now the common law having given every man a right to practise in any profession or business in which he is competent, the effect of 14 Henry VIII. must be taken to be this, viz. it has left to every man his common law right of practising in the profession of physic, as in any other profession, if competent, and has appointed the president and college to be judges of this competency. (Willcock, p. 38.) The mode of examination is wholly in the discretion of the college, which has confided the immediate direction of it to the censors. It has however also appointed that the doors of the censors' chamber shall be open to all fellows who may think proper to be present, and that they may take part in the examination, should they think fit; and that the fellows may have an opportunity of availing themselves of this right, it is appointed that all examinations shall take place at a court held at certain regular intervals. (*Ibid.*, p. 41.)

The order of Candidates was abolished in 1836, as above stated, but there were reserved to students then in the universities of Oxford and Cambridge their *inchoate* rights.

The order of Fellows comprises those who are admitted into the fellowship, community, commonalty, or society of the college. The charter incorporated all physicians then legally practising in London, so that each of them who thought proper to accept it became *ipso facto* a member or fellow; but as all future practitioners, within the precincts of and seven miles round that city, were required to obtain the licence of the college, there soon arose two orders of the profession. The fellows attempted by various bye-laws to limit their own number, but seem to have considered the licentiates as members of the college, or the commons, and themselves as forming a select body for the purpose of government. To this state of the society, the statute 32 Henry VIII. seems to allude in speaking of the 'commons and fellows.' The charter of Charles II. expressly notices these orders as forming the body of the society, inasmuch as it directed that new fellows should be elected from among the commons of the society. (*Ibid.*, p. 44.)

The following is a short account of the bye-laws of the college respecting the election of Fellows:—It was at first provided (anno 1555), that no one should be admitted into the college until he had practised for some time under a probationary licence, which time was afterwards limited to four years. This was perfectly reasonable and consistent, as affording a proper opportunity of making the candidate and his qualifications and title to precedence known to his electors. About the same time were established the three classes of fellows, candidates, and licentiates. In 1637, it was ordained that no person should be admitted a fellow until he had performed all his exercises and disputations in one of the 'British universities,' without dispensation; and in 1737, that none should be admitted into the society of the college who should not first have been of the number of candidates for one whole year, or have publicly read physic for three years in some 'university of Britain,' or been doctor of the chair in some university of this kingdom, or ordinary king's physician. In 1751, under the pretence of explaining the words 'any British university,' in some of the former bye-laws, it was declared that no person should be admitted who was not a doctor of physic of Oxford or Cambridge. Another alteration was introduced in 1765, by excluding all except such candidates, and the king's or queen's ordinary physician with salary, and the regius professors of physic of Oxford and Cambridge: and in or soon after the year 1768, it was declared that no person should be admitted to the order of candidates unless he had been created a doctor of physic in the university of Oxford or Cambridge, or, having obtained that degree in the university of Dublin, had been incorporated into the university of Oxford or Cambridge; and until he had been examined as to his knowledge of physic at three of the greater or lesser meetings of the college: and that no person might be admitted a fellow unless he had been a candidate for a year, except that the president might once in every other year propose at the comitia minora one licentiate of ten years' standing; and if the greater part of the comitia minora should consent, propose him at the next comitia majora to be elected a fellow; and if the greater part of the fellows then present should consent, such licentiate might be admitted a fellow; and that any of the fellows might propose a licentiate of seven years' standing, and of the age of thirty-six years, in the comitia majora to be examined; and, if the greater part of the fellows should consent, the licentiate might be examined by the president, or vice-president, and censors; and if approved by the greater part of the fellows then present, he might be proposed to the next comitia majora to be a fellow, and admitted, should the majority of fellows then present consent. (*Ibid.*, p. 46.)

These bye-laws are considered in law invalid, and are directly contrary to the original charter. The statute rendered all men of the faculty of and in London eligible to the fellowship: the bye-law says, all men of the faculty of and in London are not eligible, but those only who have been of the order of candidates for one year; and none can become candidates who are not graduates of Oxford or Cambridge. This is directly in the teeth of the statute: it is the imposing a qualification not required by the constitution; and (what is most fatal to such a qualification) one which does not depend upon the body imposing it, or any select portion of that body, but on two universities, in legal acceptation strangers to and unconnected with this college, and wholly overlooked by the statute by which it was established. (*Ibid.*, p. 49.)

It would be impossible here to give an account of all the literary controversies in which the College of Physicians have been continually engaged, partly in support of their own just and undoubted rights, and partly in defence of their arbitrary and unwise limitations with respect to the election of fellows. A list of the titles of more than fifty pamphlets, &c., written for or against the college between the years 1665 and 1810, is given in a work entitled 'An Exposition of the State of the Medical Profession in the British Dominions; and of the Injurious Effects of the Monopoly, by Usurpation, of the Royal College of Physicians in London,' 8vo., Lond., 1826, pp. 373. After much dispute and discussion, these obnoxious bye-laws have lately been repealed, and the following regulations have been published by authority of the college

Regulations of the Royal College of Physicians of London.

The College of Physicians, having for some years past found it necessary, from time to time, to make alterations in the terms on which it would admit candidates to examination, and license them to practise as physicians, has reason to believe that neither the character nor object of those alterations, nor even the extent of the powers with which it is invested, has been fully and properly understood.

The college therefore considers it right at this time to make public a statement of the means which it possesses, within itself, of conferring the rank and privileges of physician on all those who, having had the advantage of a liberal education, both general and professional, can prove their qualifications by producing proper testimonials and submitting to adequate examinations.

Regulations regarding Certificates and Testimonials.

Every candidate for a diploma in medicine, upon presenting himself for examination, shall produce satisfactory evidence, 1, of unimpeached moral character; 2, of having completed the twenty-sixth year of his age; and, 3, of having devoted himself for five years, at least, to the study of medicine.

The course of study thus ordered by the college comprises:—

Anatomy and physiology, the theory and practice of physic, forensic medicine, chemistry, materia medica and botany, and the principles of midwifery and surgery

With regard to practical medicine, the college considers it essential that each candidate shall have diligently attended, for three entire years, the physicians' practice of some general hospital in Great Britain or Ireland, containing at least one hundred beds, and having a regular establishment of physicians as well as surgeons.

Candidates who have been educated abroad will be required to show that, in addition to the full course of study already specified, they have diligently attended the physicians' practice in some general hospital in this country for at least twelve months.

Candidates who have already been engaged in practice, and have attained the age of forty years, but have not passed through the complete course of study above described, may be admitted to examination upon presenting to the censors' board such testimonials of character, general and professional, as shall be satisfactory to the college.

The first examination is in anatomy and physiology, and is understood to comprise a knowledge of such propositions in any of the physical sciences as have reference to the structure and functions of the human body.

The second examination includes all that relates to the causes and symptoms of diseases, and whatever portions of the collateral sciences may appear to belong to these subjects.

The third examination relates to the treatment of diseases, including a scientific knowledge of all the means used for that purpose.

The three examinations are held at separate meetings of the censors' board. The *vivâ voce* part of each is carried on in Latin, except when the board deems it expedient to put questions in English, and permits answers to be returned in the same language.

The college is desirous that all those who receive its diploma should have had such a previous education as would imply a competent knowledge of Greek, but it does not consider this indispensable if the other qualifications of the candidate prove satisfactory; it cannot however, on any account, dispense with a familiar knowledge of the Latin language, as constituting an essential part of a liberal education; at the commencement therefore of each oral examination, the candidate is called on to translate *vivâ voce* into Latin a passage from Hippocrates, Galen, or Aretæus; or, if he declines this, he is, at any rate, expected to construe into English a portion of the works of Celsus, or Sydenham, or some other Latin medical author.

In connection with the oral examinations, the candidate is required, on three separate days, to give written answers in English to questions on the different subjects enumerated above, and to translate in writing passages from Greek or Latin books relating to medicine.

Those who are approved at all these examinations will receive the following diploma under the common seal of the college:—

Sciant omnes, Nos, A. B. Præsidentem Collegii Medicorum Londinensis, unà cum consensû sociorum ejusdem, auctoritate nobis a domino rege et parliamento commissâ, examinâsse et approbâsse ornatissimum virum, T. S. et ei concessisse liberam facultatem et licentiam, tam docendi quam exercendi scientiam et artem medicam, eidemque summis honoribus et titulis et privilegiis, quæcunque hic vel alibi medicis concedi solent, intra auctoritatis nostræ limites frui dedisse. In cujus rei fidem et testimonium, adjectis censorum et registrarii chirographis, sigillum nostrum commune præsentibus apponi fecimus, datis ex ædibus collegii die ________________ mensis ________________ anno Domini millesimo octingentesimo ____________.

The college gives no particular rules as to the details of previous education, or the places where it is to be obtained. It will be obvious however, from a reference to the character and extent of the study above described, the manner in which the examinations are conducted, and the mature age of the candidates, as affording full time for acquiring the necessary knowledge, that there will be ample security afforded to the public and the profession, that none but those who have had a liberal and learned education can presume, with the slightest hope of success, to offer themselves for approval to the censors' board: and as the college trusts that, by a faithful discharge of its own duty, it can promise itself the satisfaction of thus continuing to admit into the order of English physicians a body of men who shall do it honour by their qualifications, both general and professional, it is prepared to regard in the same light, and address by the same appellation, all who have obtained its diploma, whether they have graduated elsewhere or not.

In drawing up and promulgating the above regulations, the college has endeavoured fairly to look at that which is substantial, rather than that which is merely nominal, in all that concerns the qualifications of its members; it has resolved to estimate all testimonials, whether they are presented under the name of certificates, diplomas, or degrees, strictly with reference to their value, and to measure them by this standard alone, as parts of the previous qualification of candidates, which they are to verify in their examinations.

The college feels confident that it has overstepped neither the spirit nor letter of the laws which have invested it with the power of governing and legislating for the whole faculty of medicine within its jurisdiction, by thus earnestly endeavouring to maintain its character and reputation, and vindicate its claim to be the source of professional honour.

Dec. 22, 1838. FRANCIS HAWKINS, *Registrar.*

Much curious information respecting the antiquities of the College of Physicians is to be found in 'The Gold-headed Cane,' an amusing and interesting little volume by the late Dr. Macmichael. He tells us (p. 120) that its very first meetings immediately after its establishment, 1518, were held in the house of Linacre, called the Stone House, No. 5, Knight Rider Street, which still belongs to the college. About the time of the accession of Charles I., the college removed to another spot, and took a house of the dean and chapter of St. Paul's, at the bottom of Amen Corner. During the civil wars, their premises were condemned, as part of the property of the church, and sold by public auction; on which occasion, Dr. Hamey became the purchaser, and two years afterwards, 1649, gave them in perpetuity to his colleagues. The great fire of London, 1666, consumed the college, and the whole of the library with the exception of one hundred and twelve folio volumes. For the next few years, the meetings of the fellows were generally held at the house of the president, while a new college was being built on a piece of ground that had been bought in Warwick Lane. This was completed in four years, and was opened, without any particular ceremony, on the 25th of February, 1674, under the presidency of Sir George Ent. Here the fellows continued to hold their meetings till within a few years, when (as Dr. Macmichael says) 'the change of fashion having overcome the *genius loci,*' the present new college, at the north-west corner of Trafalgar Square, was opened on the 25th of June, 1825, and an elegant Latin oration was delivered by the president, Sir Henry Halford.

PHYSICS. The word *phy'sike* (φυσική), or science of nature, might include in one general term all that is called mixed mathematics, natural philosophy, chemistry, and natural history. The title of physician, or student of nature, has become in our language synonymous with one who investigates the origin of diseases and the means of cure; but in the continental languages it still retains the more general signification. Also physic (the study of nature) has come to mean the drugs given to cure disorders, or medicines; and it would be difficult to name two more complete departures from etymology.

The plural physics is always used to mean the study of nature by means of the severer modes of investigation. Some apply it to the application of mathematics to material phenomena, and to this alone; others, distinguishing the preceding as mathematical physics, include under the general term the sciences of experiment. There is no usage which in any degree approaches a universal reception; we prefer the second-mentioned signification.

PHYSIOGNOMY (φυσιογνωμονία) is the art of determining the mental character of an individual by the examination of his countenance. The popular ideas of the indications afforded by different kinds of features, by the adoption of which almost every one is at times a practitioner of physiognomy, are nearly as definite as the few principles which those who have made it an object of peculiar study have established. The circumstance on which the chief and surest indications afforded by the countenance depend, is, that when certain feelings and habits are much indulged in, the positions of the features which are associated with them are apt to become permanent, either by the formation of wrinkles or other marks in the skin, or by the enlargement and disproportionate strength of the muscles chiefly exerted. Thus a person in the frequent habit of sneering contemptuously acquires at last a slight curve in his upper lip by the disproportionate size and power of its elevator muscle; he who is often meditating has the wrinkles of the slight frown and the contraction of the brows which are commonly associated with deep thought, permanently fixed; he who has his attention constantly alive to the objects around him acquires an expression of vivacity in the openness of his eye and the quickness of the motions of all the muscles of his face; while he, on the other hand, whose thoughts are rarely roused to active efforts, acquires a smoothness of feature and a sluggishness of action in the several parts of the face, which indicate that its muscles have been exercised as rarely and with as little energy as his thoughts.

The peculiarities of feature thus acquired are often transmitted from the parent to the child; and in the latter, their indications will be correct or false according as there has or has not been a coincident transmission of the parent's disposition. Or a child may acquire a peculiar expression of countenance by imitating those among whom it is placed, and in this case also it will only be by accidental coincidence that the indications of the features are correct. From these and other sources of fallacy, the attempts to raise physiognomy into a science have not been so successful as to encourage a deeper study of it than every one unconsciously engages in during his intercourse with the world.

PHYSIOLOGY (φυσιολογία, from φύσις, nature, and λόγος, discourse) is the science which treats of the phenomena of living bodies. Its several departments are considered in separate articles, in which a complete system may be found in those on LIFE, DIGESTION, ABSORPTION, CIRCULATION (HEART), RESPIRATION, NUTRITION, SECRETION (GLAND), BONE, SKELETON, ARTICULATION, MUSCLE, LARYNX, NERVE, BRAIN, the several organs of the SENSES, EMBRYO, OVULE, and the articles on the anatomy and special physiology of the individual organs of animals and plants, which are referred to in each of the preceding.

PHYSO'GRADA, a family of marine animals, arranged by M. de Blainville, in his synoptic table, under the *Zoophytes*, but as one of the aberrant or false forms of that class, and as animals improperly referred to them.

These *Physograda*, according to M. de Blainville, have a regular, symmetrical, bilateral, contractile, fleshy body, often very long, provided with a complete intestinal canal, with a more or less considerable aëriferous dilatation; there are a mouth and anus, each of them terminal, and anomalous branchiæ in the form of very long, very contractile cirrhi, intermingled with the ovaries.

M. de Blainville remarks that the animals which constitute this group are so anomalous at first sight—they seem to recede so much from known types, that it is difficult to form anything like a satisfactory idea concerning them. Zoologists therefore who have followed the natural method, were obliged, in placing them among the radiated animals, to make of them a particular section, under the name of anomalous or irregular *Radiata*; and in truth very anomalous *Radiata* they were, having nothing about them of a radiated disposition of structure.

Another reason which contributes to the difficulty of following out the relations of the *Physograda*, is the rarity of finding them in an unmutilated state, and above all because it is almost impossible to preserve them in collections, so frail and delicate is their structure. Even when consigned to the spirit in a perfect state, they become so changed from contraction, that their natural form and structure are scarcely to be recognised.

M. de Blainville further observes that he had long entertained grave doubts as to the place assigned to those animals in the zoölogical scale, founded solely on external form, which, according to his principles, is sufficient to determine the degree of organization of an animal; but he had not succeeded in elucidating them completely up to the time when MM. Quoy and Gaimard submitted to his observation many specimens of the common *Physalus*, and M. Hérissier de Gerville sent him an individual tolerably perfect, freshly preserved in spirit of wine. Since then M. de Blainville had opportunities of observing some specimens of *Physsophora* and *Stephanomia*, also communicated to him by MM. Quoy and Gaimard; so that he thinks he is able to withdraw all these animals from the type of the *Actinozaria*, to form a distinct order of them under the type of *Malacozoaria*. Nevertheless, he observes, the *Stephanomiæ* may not belong to the same family as the *Physsophoræ* properly so called.

The authors, says M. de Blainville, in continuation, who have spoken of the animals that constitute this order, are rather numerous; but only a small number of those authors have examined them, and that incompletely. The *Physali* were first observed, and from the time of Browne,* who first figured them, down to M. Lesson, who published some new ones in the Atlas, illustrating the voyage round the world by Captain Duperrey, there are few voyagers who have not noticed them. Forskael seems to have known the *Physsophoræ* best; but these have been least observed. The *Stephanomiæ* were discovered by Péron and Lesueur; but the individuals from which they characterised the genera were incomplete. The work of MM. Quoy and Gaimard on the *Physsophoræ* was addressed to the Academy of Sciences at Paris, during their last voyage in the Astrolabe, commanded by Captain d'Urville.

It is by the aid of these different works, and especially from the means generously afforded to M. de Blainville by MM. Quoy and Gaimard that he has produced the arrangement which we proceed to lay before our readers. (*Actinologie*, 1834.)

But before we enter upon the divisions and subdivisions it will be necessary to apprise the reader that very great obscurity still veils much of the organization of these animals, that part of it especially which relates to the propagation of the species. It is now well known, through the labours of some distinguished continental zoologists, that several of the *Medusæ*, probably all, are diœcious [PULMOGRADA]; but the generation of the group before us is not yet satisfactorily made out; at least after some research we cannot find that it is. We now turn to M. de Blainville's arrangement.

*

Natatory organ simple and lamellar.

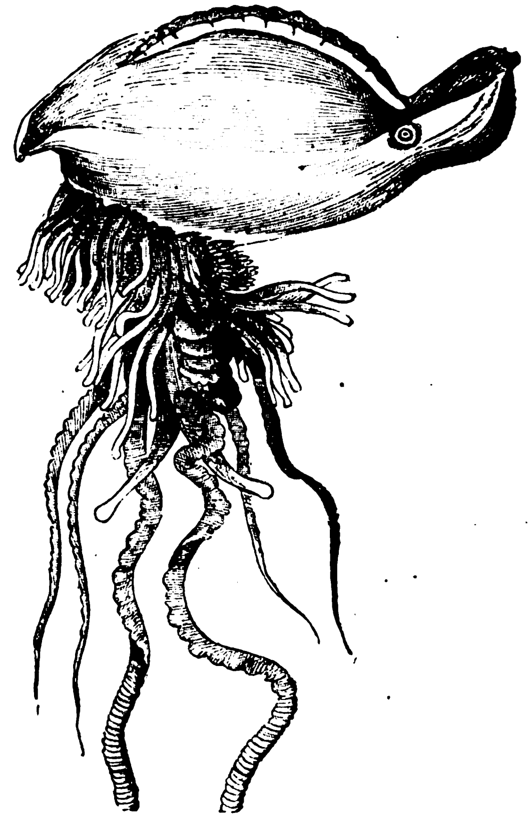
Physalia.

Generic Character.—*Body* oval, rather elongated, more narrow and proboscidiform anteriorly, hydatiform in the middle, attenuated and obtuse posteriorly, mouth star-shaped and terminal; anus lateral; a foot in form of a crest or oblique lamina, directed from before backwards; branchiæ very anomalous, and composed of a great number of diversiform cirrhous productions; organs of generation terminating at the anterior third of the right side by two closely approximated orifices. (De Blainville.)

As to the molluscous relationship and the organs of generation—*quære*.

Example, *Physalia Arethusa*.

This is the *Aretusa* of Browne; *Medusa Caravella* of Müller and Escholtz; *Physalus pelagicus* of Lamarck; the Portuguese man-of-war of English voyagers. When the crest is expanded it has been very probably mistaken for Argonauta Argo, the Paper Nautilus, by those who have declared that they have seen fleets of the latter sailing. This *Physalus* is an inhabitant of the warm seas, but a shoal of them are sometimes driven into our bays, particularly on the south-west coast. 'When we were in about 46° of



Physalus pelagicus: the crest not expanded.

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* Sloane?

northern latitude,' says Sloane, in his 'Voyage to Jamaica,' 'I first saw what the seamen call a *Caravel*, or *Portuguese* man-of-war, which seems to be a *zoophytum*, or of a middle nature between a plant and an animal; it is of that kind of the soft fishes called *Urticæ*, from their stinging quality, and to me seems different from any described by any natural historian. I shall call it *Urtica marina, soluta, purpurea, oblonga, cirrhis longissimis;* and he figures it with the crest or lamina expanded as '*A. carvell.*,' plate iii., *fig.* 5.

* *

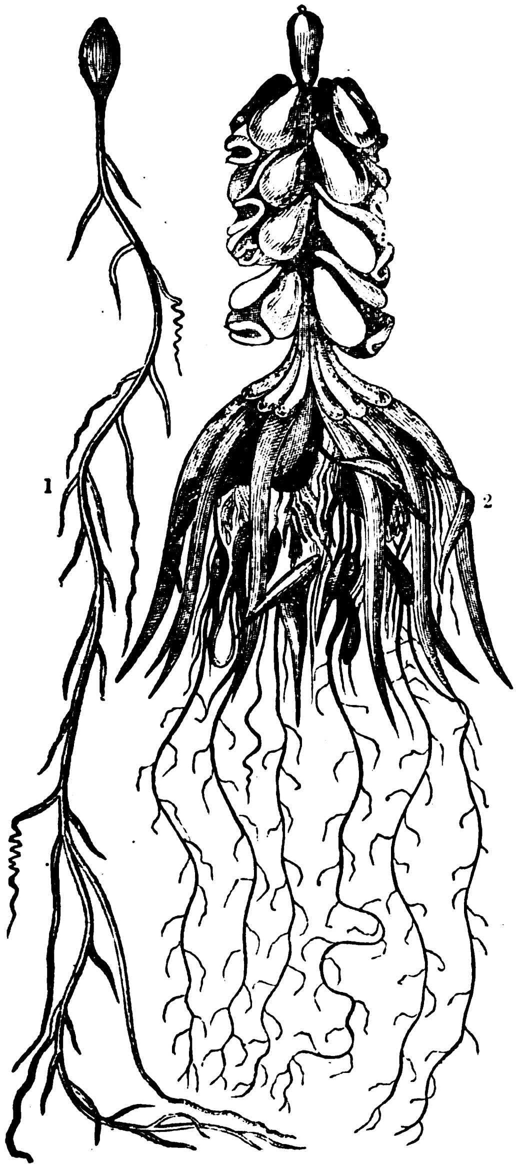
Locomotive organs complex and vesicular.

Physsophora.

Generic Character.—Body more or less elongated, cylindroïd, hydatiform in its anterior part, provided below with two series of vesicular diversiform bodies, with a regular aperture, and behind with a variable number of very diverse cirrhiform productions, two of which are longer and more complex than others; mouth at the extremity of the hydatiform part; anus terminal; organ of generation? (De Blainville.)

Example, *Physsophora Muzonema.*

M. de Blainville states that the *Physsophoræ* differ from the *Physali* in swimming or floating in a vertical position, the aëriferous pouch being above and the cirrhiferous productions below. The distinction of the species appears to him to depend especially on the number and form of the natatory organs.



1. Rhizophysa filiformis; 2, Physsophora Muzonema.

Diphysa.

Generic Character.—Body cylindrical, elongated, contractile, muscular, composed of three parts, the anterior part vesicular, the middle part bearing on its lower part two hollow natatory organs, placed one before the other, and the third part (which is the longest) provided above with a fibrillo-capillaceous plate, and below with cirrhiform productions; mouth terminal; anus? (De Blainville.)

Example, *Diphysa singularis* (Quoy and Gaimard; *Astrolabe, Zoologie*).

Rhizophysa.

Generic Character.—Body free, transparent, very contractile, very much elongated, swollen at one extremity into a sort of aëriferous bladder with a terminal orifice, provided throughout its length with scattered tentaculiform productions mingled with cirrhiform filaments. (De Blainville.)

This genus is divided by M. de Blainville into two sections.

1.

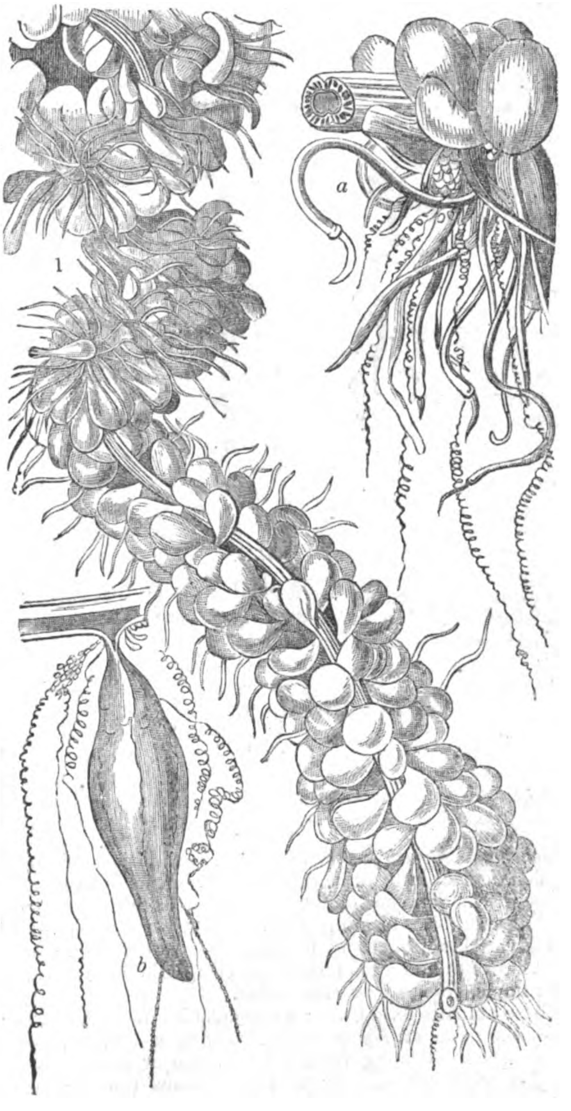
Species with simple tentaculiform productions. Natatory organs hollow. (Genus *Rhizophysa.*)

Example, *Rhizophysa planostoma*, Péron; (*Rhizophysa Péronii*, Esch., *Acaleph.*, p. 148, No. ii., t. 13, *fig.* 3).

2.

Species whose tentaculiform productions are covered with cirrhiform filaments. Natatory organs unknown. (Genus *Epibulia*, Esch.)

Example, *Rhizophysa filiformis* (*Physsophora filiformis*, Forsk.), represented above.



1, a portion of Apolemia Urania.
2 a part still more highly magnified; *b*, a single sucker.

* * *

Species provided with two sorts of locomotive organs, the anterior ones hollow, the posterior solid.

Apolemia.

Generic Character.—Body very much elongated, cylindrical, vermiform, provided anteriorly with many hollow natatory organs in two rows, and behind with solid squamous organs, between which come forth tentaculiform cirrhi, furnished with vermiform suckers.

Example, *Apolemia Urania.*

Stephanomia.

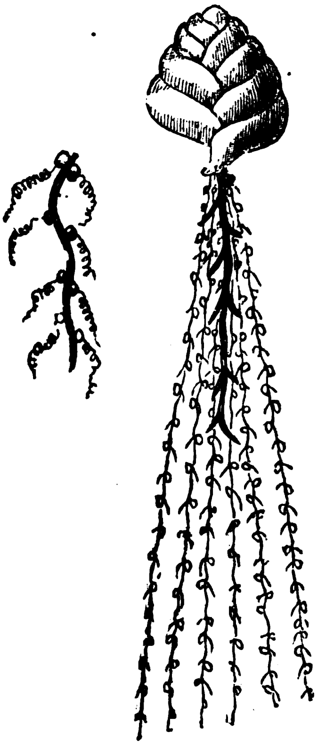
Generic Character.—Body in general very much elongated, cylindrical, vermiform, covered throughout its extent, except in the lower median line, with squamous natatory organs, full and dispersed in transverse bands, between which come forth, and especially inferiorly, long, very much diversified cirrhiform productions, mingled with the ovaries. Orifices of the intestinal canal terminal. (De Blainville.)

Example, *Stephanomia Amphitrides*, Péron et Lesueur (*Voyage aux Terres Austr.*, p. 45, pl. 29, *fig.* 5).

Protomedea

Generic Character.—Body free, floating, cylindrical, fistulous, very long, provided above with an imbricated assemblage of gelatinous bodies (on two alternate rows) which are full and hippopodiform, and throughout the rest of its length with filamentous, cirrhous, diversiform productions. Mouth proboscidiform, at the extremity of a sort of vesicular stomach.

Example, *Protomedea lutea.*



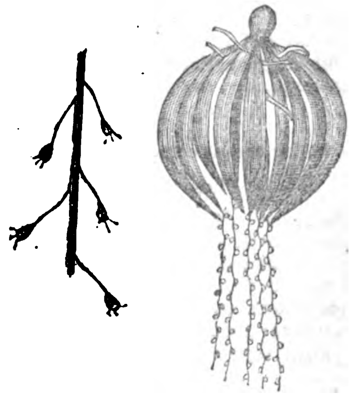
Protomedea lutea.

Rhodophysa.

Generic Character.—Body short, cylindrical, fleshy, swollen above into an aëriferous bladder, and provided below with a variable number of gelatinous bodies, which are full, costiform, forming a single transverse series, and with a variable number of filamentous diversiform productions. Mouth and anus terminal. (De Blainville.)

Example, *Rhizophysa Helianthus.*

These animals form Cuvier's second order of Acalephans, under the name of *Hydrostatic Acalephans*. He characterises them as being recognised by one or two ordinary vesicles filled with the air, by whose means they are suspended in the water. Appendages singularly numerous and varied in form, some of which probably serve as suckers, others perhaps as ovaries, and some, longer than the others, as tentacula, are joined to these vesicular parts to compose the whole apparent organization of the animal. Cuvier adds that it is not observed whether they have a mouth well distinguishable as such. (*Règne Animal*, 1830.)

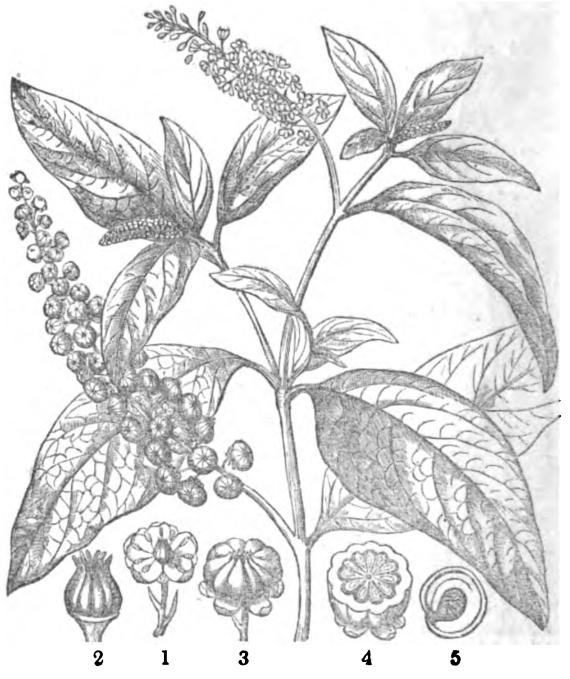


Rhodophysa Helianthus.

PHYSSO'PHORA. [Physograda.]

PHYTO'CRINUS. [Encrinites, vol. ix., p. 391.]

PHYTOLACCA, a genus of tropical or subtropical herbaceous plants, with erect or occasionally twining stems, a thickish turnip-shaped root, alternate undivided broad leaves, and leafless erect racemes of flowers succeeded by deep purple fruits. They have a five-parted calyx, no corolla, from five to thirty stamens inserted into a fleshy disk, and the pistil consists of several unilocular distinct carpels united at the base or along the whole inner angle. The fruit is an umbonate depressed berry, with solitary seeds whose embryo is turned round mealy albumen. *Phytolacca decandra*, a species found wild in Virginia, where it is called Pocan, whence the vulgar name of Poke applied to this species, has a root which acts as a powerful emetic, but its exhibition is attended with narcotic effects: its berries are also reported to possess the same quality; they stain an intense purple colour, and are said to be employed in Portugal as a means of improving the appearance of inferior red wines. Notwithstanding the acridity of its leaves, this plant, when very young, is said to be eaten in the United States as asparagus; and Dr. Royle relates that he found *P. acinosa*, a Himalayan species, employed in the same manner in the north of India, to be very palatable when boiled.



Phytolacca decandra.

1, an expanded flower; 2, the pistil; 3, a ripe fruit; 4, the same, cut through transversely; 5, a vetical section of a seed.

PHYTOLACCA'CEÆ form a small natural order of plants, named after the subject of our last article, but whose limits and position in a natural series are unsettled. According to most writers they are regarded as apetalous plants and allies of the Chenopodiaceous and Polygonaceous orders, from which their distinct ovaries chiefly distinguish them. But Endlicher, in his recent arrangement of plants, probably influenced by the form of their embryo, and by the plurality of the carpels, considers them as related on the one hand to the Caryophyllaceous, and on the other to the Malvaceous orders. Notwithstanding the apparent difference between these two stations, it is probable that both are correct, and that Phytolaccaceæ are really plants connecting Chenopodiaceæ and Caryophyllaceæ. If so, they furnish a new proof of the badness of the fundamental divisions proposed for Exogens by both De Candolle and Jussieu. With the exception of Phytolacca, no plants of this order appear to be of much importance to man; their properties seem to be generally acrid.

PHYTOSAU'RUS, Jaeger's name for a genus of fossil Saurians. Two species are recorded, *Phytosaurus Cubicodon*, and *Ph. Cylindricodon*, both from the dolomitic sandstone (Keuper formation).

PHYTO'TOMA. [MUSOPHAGIDÆ, vol. xvi., p. 28.]

PHYTOTOMI'NÆ. [MUSOPHAGIDÆ, vol. xvi., p. 28.]

PHYTOZOA'RIA. This is the general term employed by M. Ehrenberg to include the numerous species and genera of minute animals living in water, for which by other writers the titles of Infusoria and Microzoaria are preferred. There are two grand divisions, or classes as Ehrenberg calls them, of the Phytozoaria, viz. Polygastrica and Rotatoria or Rotifera; and as, judging from some examination, and in accordance with many modern writers, we consider these classes to be really and widely distinct, so as to deserve to be placed in very different parts of the scale of animal organization, we treat the subject under those terms respectively. [INFUSORIA; MICROZOARIA; POLYGASTRICA; ROTATORIA.]

PHYZE'LIA, one of the divisions of the *Terebelles* of Savigny (*Amphitrite*, Cuv., part; *Annelides Tubicoles* of Cuv.).

PIA MATER. [BRAIN.]

PIACENZA (*Placentia*), a town in the duchy of Parma, and the second in importance in that state, is situated about half a mile from the southern bank of the Po, and two miles east of the confluence of the Trebbia with that river, in a fine plain bounded on the south by well cultivated hills. The town is surrounded by walls and ditches, and has a citadel, which, according to a stipulation of the Congress of Vienna of 1815, is garrisoned by Austrian troops. The streets are wide and straight. The principal square in front of the ducal palace is adorned with two equestrian bronze statues of dukes Ranuccio and Alessandro Farnese. Piacenza abounds in fine buildings, the principal of which are—1, the ducal palace, commenced after the design of Vignola, but not finished; 2, the Podesteria, or town-house, a Gothic building of the thirteenth century; 3, the cathedral, a handsome Gothic structure of the twelfth century, with fresco paintings by Guercino and Luigi Caracci; 4, S. Sisto, a handsome church, richly adorned; 5, the fine church of S. Agostino; 6, Santa Maria di Campagna, which belongs to the Franciscan friars, has some fine paintings. The town library contains 30,000 volumes; the new theatre, and the school of design and architecture, are also worthy of notice.

Piacenza contains 25,000 inhabitants, who carry on a considerable trade in the agricultural products of the country. The establishments for public instruction consist of a superior school, or lyceum, with professors of law and medicine; a secondary or grammar school, the college Alberoni for boarders, a school of the fine arts, an institution for the education of young ladies, and several elementary schools for boys and girls.

Placentia is first mentioned as being a Roman colony, settled at the same time as Cremona, in the country conquered from the Gauls, in the year 224 B.C. (Livy, *Epitome*, xx.) In the second Punic war it was besieged unsuccessfully by Hasdrubal while on his march to join his brother Hannibal; but after the end of that war it was taken and destroyed by a band of Ligurians and Gauls, headed by Hamilcar, a Carthaginian officer, who had remained behind after the defeat of Hasdrubal, and had succeeded in organising the mountaineers of the Ligurian Apennines, and leading them against the Romans. (Livy, xxxi. 10.) After the defeat and death of Hamilcar by the Roman prætor L. Furius Purpureus, the colony of Placentia was restored. Tacitus (*Histor.*, ii. 21) mentions Placentia as being gallantly defended by Spurinna, a captain of Vitellius, against the attack of Cæcina, one of Otho's generals, on which occasion a splendid amphitheatre, which stood outside of the walls, was destroyed. It was near Placentia that the Roman troops under Aurelianus were defeated in a great battle by the Marcomanni, who had invaded Upper Italy, but Aurelianus afterwards defeated and exterminated the invaders, A.D. 271.

In modern history Piacenza is mentioned as one of the independent Lombard cities. It afterwards had its lords or tyrants of the families of Pelavicino or Pallavicino, Scotti, and Landi. It next fell under the dominion of the Visconti dukes of Milan. After the death of Filippo Maria Visconti, A.D. 1447, and the establishment of an ephemeral republic at Milan, the citizens of Piacenza revolted against the Milanese, and placed themselves under the protection of Venice. But Francesco Sforza, being appointed commander of the Milanese, retook Piacenza, in December, 1447, when the town was given up to pillage. The soldiers of Sforza committed all sorts of violence and cruelty, sparing neither age nor sex; even the churches were not respected. The Milanese historians Corio and Simoneta fully relate those atrocities. From that time Piacenza never recovered its former prosperity: it remained subject to the Sforza dukes of Milan, was taken by the French under Louis XII., and retaken from the French by pope Julius II., after which it remained subject to the popes, together with Parma, until 1545, when pope Paul III. gave it to his son Pier Luigi Farnese. From that time it has formed part of the duchy of Parma.

Piacenza has produced many distinguished men: the scholar Valla, pope Gregory X., Cardinal Alberoni, Gio. Battista Porta, the economist Gioia, the philologist Giordani, and others who are noticed by Poggiali, 'Memorie per la Storia Letteraria di Piacenza,' 2 vols. 4to., 1778; and in the 'Memorie Storiche della Città di Piacenza,' by the same writer. A description of the buildings and other objects worthy of notice was published in 1828: 'Descrizione dei Monumenti e Pitture di Piacenza,' 8vo.

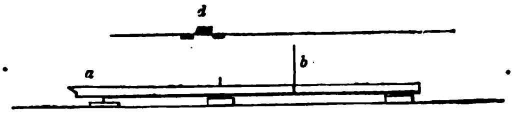
PIAHAU, or PIAUHAU, the name assigned to certain *Cotingas* (*Ampelis*, Linn.), whose bill is more strong and more pointed than the ordinary *Cotingas*. The *Piauhaus* are so called from their cry, and are very insectivorous. Vieillot has distinguished them by the generic name of *Querula*. [MUSCICAPIDÆ, vol. xvi., p. 11.]

PIANO-FORTE, a keyed musical instrument, variously formed and under different denominations, such as *grand*, *square*, and *upright*. The first notion of the square piano-forte was taken from the clavichord by a German mechanic of the name of Viator, about ninety or a hundred years ago; but, for want of friends or funds, he never became known as a maker. The invention however was followed up by other musical instrument makers of the same nation, who all left their clavichords and harpsichords for the new instrument, the piano-forte. Thus we have Zumpe, Tabel, Schudi, Kirkman, Broadwood, Stodart, Schoene, Buntebart, Pohlman, Pether, Beck, Garcha, Ganer, and a host of others.

The grand piano-forte is supposed to be of earlier date than the square piano-forte, and is said to have been the invention of a German musician of the name of Schröder, or, as others say, of Christofali, a harpsichord-maker of Padua. The first maker at all known in this country was a German of the name of Backers, but we are not aware that success attended his exertions with the solid advantages which were enjoyed by his contemporary Zumpe, who realised an ample fortune, and retired. The place of his retirement we well remember, and have heard good report of his cheerful glass and well-filled pipe, without which, in those days, a German did not acknowledge that he lived. The grand piano-forte retains the shape of the instrument from which it was taken, the harpsichord; and although that shape has been much condemned, we have never been able to see any other objection to it than its largeness; it is the natural outline of the instrument, and we do not think that a better form for it will ever be devised.

The square piano-forte, we have said, was taken from the clavichord, but it retains only its shape, with the same disposition of the strings and keys; their actions have no similarity. The action of the clavichord was simply a piece of brass pin wire, which was placed vertically at a point where it could be struck or pressed against its proper string, the right-hand division of which was free to vibrate, whilst the left-hand was muffled by a piece of cloth, the object of which was to damp or stop the string, which it did the instant the finger was taken off the key. The touch of the clavichord was peculiar, partaking both of the harpsichord and the organ; in other words, both *struck* and *pressed*, and the pressure could be so varied as to produce a kind of tremblant effect. The tones were feeble, soft, and melancholy, and better suited to the student, the composer, or the solitary, than any purposes of social amusement.

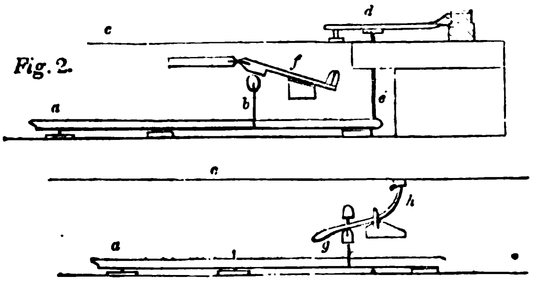
Fig. 1.



a, Key. *b*, Brass pin wire. *c*, String. *d*, Cloth woven between the strings as a damper.

The action of the square piano-forte, on its first introduction, consisted of a *key*, a *lifter*, a *hammer*, and a *damper*. The key was the same as that of the clavichord. The lifter was a brass wire, with a piece of hide leather as a head, which was covered with a piece of soft leather as a finish. This lifter, when in motion, struck the hammer against the string, and thus produced the tone of the instrument. The damper followed the performer, and stopped the vibrations as quickly as the finger was removed from the key. (See *fig.* 2.) The tone of this piano-forte was thin and *wiry*, the hammer having only one slight covering of sheep-skin leather upon it.

Fig. 2.

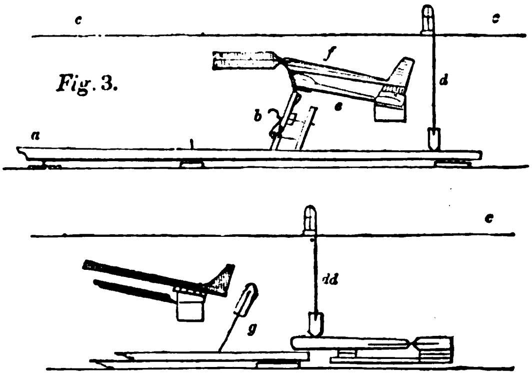


a, Key. *b*, Lifter. *c*, String. *d*, Damper. *e*, Damper stick or *mopstick*. *f*, Hammer. *g*, Lifter. *h*, Brass damper.

This rude idea of a piano-forte continued in use for many years, and the first improvement upon it was introduced by Longman and Broderip, who brought out a patented invention having two additional parts in the action, namely, the *hopper* and the *under-hammer*, as they were called (see *fig.* 3). This patent was followed by another introduced by Clementi and Co., the burden of which simply was an improvement on the damper. It was called the *Irish patent*, from its having been the invention of an Irishman of the name of Southwell; but it had simplicity only to recommend it, was found inconvenient, and shortly afterwards was superseded by what is now called the *crank* damper. We cannot give the name of the inventor of this improvement; it became so instantaneously general, that the inventor was lost sight of in the crowd of makers who adopted his invention. It is still in use, and is acknowledged to be a good and sufficient plan. The damper used by Messrs. Broadwood previously to the introduction of the crank damper was made in brass (see *fig.* 2), but by whom invented we do not know. We now come to the last addition which has been made to the action of the square piano-forte, the *check*. This member was borrowed from the grand piano-forte, and is so acknowledged by the name given to those square piano-fortes which have it; for they are always called, par excellence, *grand-square piano-fortes*. The check certainly is a most important part of a piano-forte, and the best of actions is nothing without it. The check is placed behind the hammer, nearly at the end of the key; where, after the blow has been given, it catches the tail of the hammer, and holds it till another blow is required (see *fig.* 3). For further information as to the square piano-forte, we refer to the diagrams, which we hope will be found sufficient for any information that may be required. As an instrument, we think less of the square piano-forte than any other: it has neither the touch, the tone, nor the appearance of either the grand or the upright.

Fig. 3, *exhibiting all the Varieties of the modern Square Piano-forte as respects the Action.*

Fig. 3.

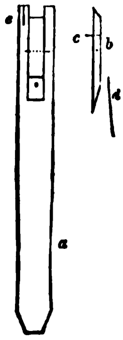


a, Key. *b*, Hopper, by which the escape of the hammer is effected. *c*, String. *d*, Irish damper. *dd*, Crank damper. *e*, Under hammer. *f*, Hammer. *g*, Check.

The grand piano-forte, as above observed, was the invention of Schröder or Christofali, manufactured by Backers, and retains the shape of the instrument from which it was taken, the harpsichord. Here again we have two instruments alike in *form*, but unlike in almost every other circumstance; for their action, their tones, and the style in which they are played upon, are all entirely different. The action of the harpsichord was simply a key and what was called a *jack*, which was a piece of pear-tree with a small moveable tongue of holly, through which a cutting of crow-quill was passed to touch the string when the jack was in action; the tone produced by this contrivance was a kind of *scratch* with a sound at the end of it (see *fig.* 4).

Fig. 4. *Harpsichord Jack.*

Fig. 4.



a, Jack. *b*, Tongue. *c*, Quill. *d*, Bristle spring. *e*, Cloth damper.

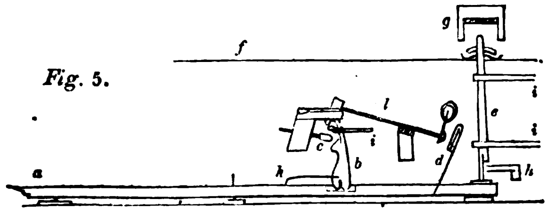
The action of a grand piano-forte consisted of a *key*, a *lever*, a *hammer*, a *button*, a *check*, and a *damper*, with rails and sockets to connect them. By this combination of parts, every musical intention known or desired at that time was perfectly attainable, and with admirable effects by Mozart, Haydn, Cramer, and others (see *fig.* 5). But we have now new and more severe judges to encounter: former actions are no longer sufficient; new effects are to be given, and new powers are called for. Fortunately, these things have been accomplished, for new actions have risen up in abundance, and we have only to choose between them. The more or less of excellence will, doubtless, occasionally puzzle the amateur, but some ready-fingered friend or acquaintance may be called in, and the difficulty is instantly removed by a single cadence on the instrument desired; whether major or minor is quite immaterial.

No musical instrument is so universally admired as the piano-forte. Its compass, whether six octaves, six and a half, or seven, is sufficient for all purposes of musical composition, and may really be considered a miniature orchestra. The smaller instruments have generally only six octaves, the grands have six octaves and a half; seven octaves we have not yet learned to admire. The strings of the early piano-fortes were partly of steel and partly of brass, the treble notes of steel, and the lower notes of brass, a few of which, in the bass, were over-lapped or covered, rather open, with plated copper-wire to give them more gravity according to the length attainable in the instrument. But modern piano-fortes have steel wire throughout, with about an octave in the bass closely lapped with unwashed copper wire. The strings which are now used in piano-fortes are considerably larger than those which were formerly used; the advantages of which are durability and firmness. The steel-wire now in use is the manufacture of Mr. Webster of Penns, near Birmingham, and is greatly superior to the once-famed German wire, now no more in esteem with English manufacturers, from the bad quality of the metal and the very imperfect manner in which it was drawn: when perfectly round, which it ought always to be, it was generally too soft; and when sufficiently hard, it was scarcely ever well manufactured, from which circumstance it was constantly false in vibration. Stops and pedals are more or less adopted in different countries. Stops can scarcely be said to be used at the present day; they properly belong to the middle age of piano-forte making, and were placed in the instrument on the left hand of the performer. The damper-stop and the buff-stop were the most common; the damper-stop raised the dampers from the strings, which gave continuation to the tones, and the buff-stop raised a piece of soft buff leather up to the strings, and gave the instrument somewhat the tone of the harp. Pedals are much esteemed by some performers and little by others; in foreign piano-fortes we find many pedals, but in the English we have scarcely ever more than two—one for piano effects, and the other for forte. This pedal, the forte, is an effective pedal, and not at all injurious to the mechanism of the instrument; we cannot say as much of the piano pedal, for, by passing the action to one string, it is not only straining to the centres of the hammers, but is also very apt to disturb the tuning of the unisons, by which an instrument is often unfairly tested as regards its standing, and a more frequent application to the tuner is required. In lieu of this pedal, some makers have introduced a soft substance, wool or leather, between the hammers and the strings, by which something like the buff-stop is accomplished, but with more delicacy and vibration in its effects. The foreign name for this pedal is *jeu céleste*, and to us it is more agreeable, and is certainly less injurious to the action of the instrument than the more frequent piano pedal.

We will here give, in alphabetical order, a few diagrams of grand actions. Their merits we must leave to those who have occasion for them, reserving only the right to make a few brief remarks that may be necessary for the purpose of this article. They are the works of living manufacturers.

Fig. 5. *The Common Grand Piano-forte Action.*

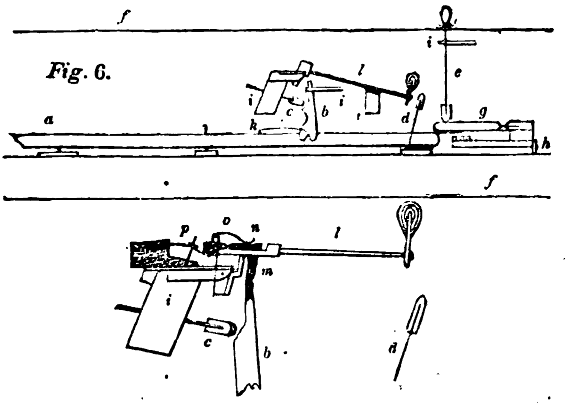
Fig. 5.



a, Key. b, Lever. c, Button. d, Check. e, Damper. f, String. g, Ruler. h, Damper pedal lifter. i i i, Rails and sockets. k. Spring. l, Hammer.

Fig. 6. *Messrs. Broadwood's former and new Patent Grand Action.* (*Invented by Mr. Southwell, son of the late Mr. W. Southwell.*)

Fig. 6.

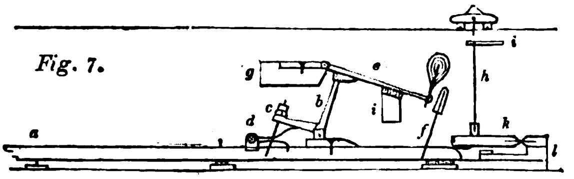


The shaded parts are the new additions, the intention of which is to keep the hammer at a certain distance from the string when the finger is on the key.

a, Key. b, Lever. c, Button. d, Check. e, Damper. f, String. g, Crank for damper. h, Damper pedal lifter. i i i i, Rails and sockets. k, Spring. l, Hammer. m, n, Block passed through the hammer butt. o, Spring fixed at the back of n, and pressing upon the front of it; by which arrangement, when the lever passes the notch, it is caught by m, and the hammer is sustained at the given height. p, Another spring, which regulates the action of o, and determines the height it shall rise.

Fig. 7. *Messrs. Collard and Collard's new Patent Grand Piano-forte Action; the Invention of Mr. George Stewart.*

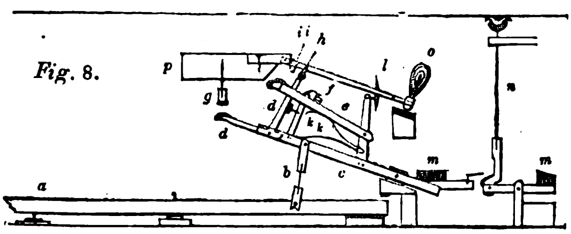
Fig. 7.



a, Key. b, Hopper. c, Button. d, Hopper spring. e, Hammer. f, Check. g, Hammer rail. h, Damper. ii, Rail and socket. k, Crank for damper. l, Damper pedal lifter.

Fig. 8. *Mr. Errard's Patent Grand Action; the Invention of his Uncle, Mr. Sebastian Errard.*

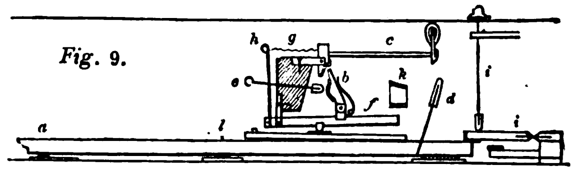
Fig. 8.



a, Key. b, Lifter centred in the key and the hopper lever. c, Hopper lever. dd, Hopper. e, Hammer sustaining lever. f, Stop for e. g, Hopper button. h, Butt for the hopper to hit against. i i, Two small wire stops acting upon e. k k, Hopper and sustaining spring. l, Check. m m, Balance weights of lead. n, Damper. o, Hammer. p, Hammer rail.

Fig. 9. *Mr. Wornum's new Grand Action.* (*This Action is based on the Piccolo Action.*)

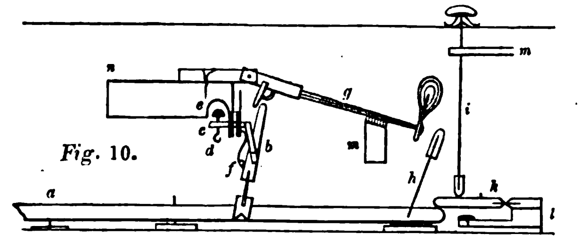
Fig. 9.



a, Key. b, Hopper and spring. c, Hammer. d, Check. e, Button to set off the hopper. f, Hopper lever. g, Tie attached to the butt of the hammer. h, Sustaining spring linked to the end of the tie, and fixed in the front end of the hopper lever, the rising of which puts the sustaining spring in action. This spring gives the *piano* blow and assists in the *forte* and repetition. i i, Damper and fixings. k, Hammer ruler and back touch. l, Wood spring to set up the hoppers.

Fig. 10. *Mr. Zeiter's new Grand Action.*

Fig. 10.

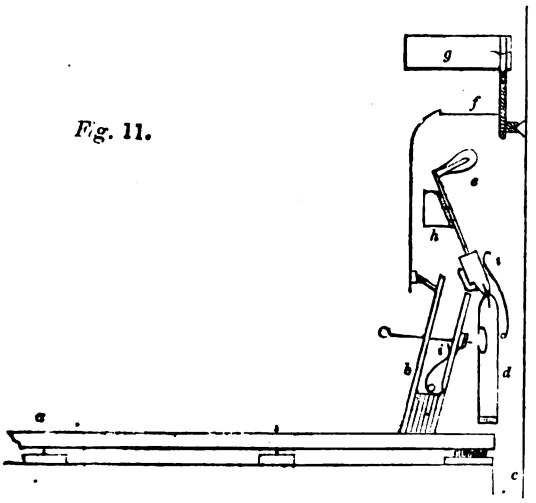


a, Key. b, Hopper, which works in the key with what is called a *bird's mouth.* c, Escapement part of the hopper and the setting off is effected by the button working in the arched part above it, d, e. d, Button and wire. e, Arch in which the button acts. f, Hopper spring. g, Hammer. h, Check. i, Damper. k, Damper Crank. l, Damper pedal action. m m, Rail and socket. n, Hammer rail.

The upright piano-forte was, doubtless, taken from the upright harpsichord, and we have always understood that it was the invention of an Englishman of the name of Hancock, a musical instrument maker resident in some part of Westminster. He was a man of much ingenuity, and produced several varieties in keyed instruments; amongst which we find the *organised piano-forte,* the *portable grand* piano-forte, and an instrument, also a piano-forte, in the shape of a *spinnet.* The portable grand, in its day, was a successful and desirable instrument, but has long since been superseded by instruments of the kind called *kit* grands, *boudoir* grands, *pocket* grands, and *semi* grands. The next novelty was the invention of John Isaac Hawkins, who constructed an upright instrument with a detached sound-board in an iron frame, and the whole was so arranged as to be able to meet the atmosphere with compensating powers. In the bass, it had spiral or helical strings, by which length was gained; and, in the treble, three octaves of equal tension were accomplished by a uniform size of wire. It was patented, but did not take with the public sufficiently to come into notice. Following Hawkins we had William Southwell, who patented an improvement in upright piano-fortes, and gave it the name of the *cabinet piano-forte*. The name still remains amongst us, but the invention has long since been superseded and laid aside. The unique piano-forte was introduced about thirty years ago by Messrs. Wilkinson and Wornum, and was the invention and patent of the latter. This instrument met the taste of the day for instruments of *little altitude;* it did not stand higher than *three feet three inches*, and the strings were all placed *diagonally* towards the floor; the action was simple and effective, but it is not now under manufacture.

Fig. 11. *Mr. Wornum's Patent Unique Action.*

Fig. 11.

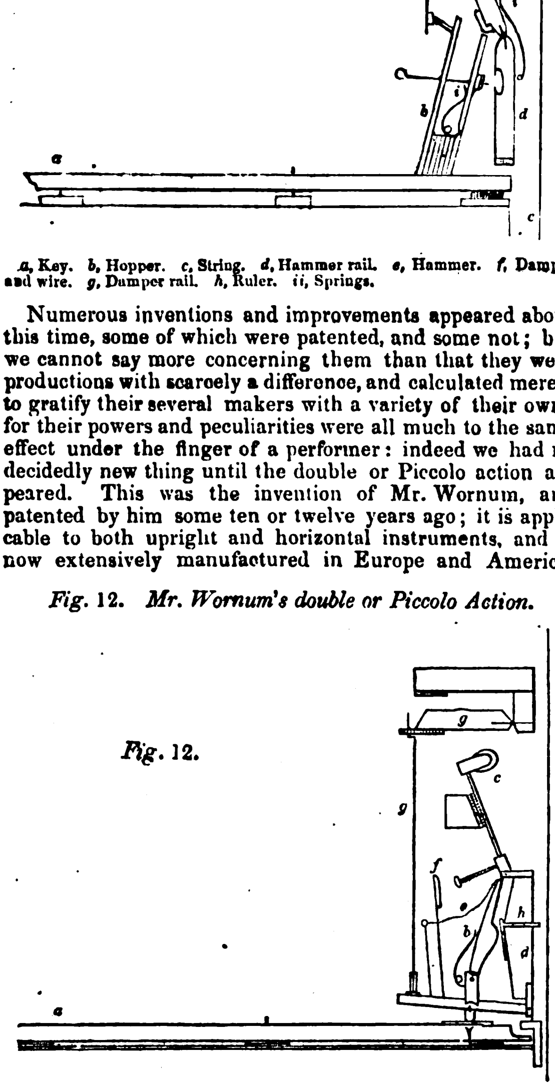


a, Key. *b*, Hopper. *c*, String. *d*, Hammer rail. *e*, Hammer. *f*, Damper and wire. *g*, Damper rail. *h*, Ruler. *ii*, Springs.

Numerous inventions and improvements appeared about this time, some of which were patented, and some not; but we cannot say more concerning them than that they were productions with scarcely a difference, and calculated merely to gratify their several makers with a variety of their own; for their powers and peculiarities were all much to the same effect under the finger of a performer: indeed we had no decidedly new thing until the double or Piccolo action appeared. This was the invention of Mr. Wornum, and patented by him some ten or twelve years ago; it is applicable to both upright and horizontal instruments, and is now extensively manufactured in Europe and America.

Fig. 12. *Mr. Wornum's double or Piccolo Action.*

Fig. 12.



a, Key. *b*, Hopper and spring. *c*, Hammer. *d*, Hammer rail. *e*, Tie and wire. *f*, Check. *g g*, Damper and wire. *h*, Setting off screw.

For delicacy, promptness, and firmness of touch, it has not yet been equalled.

There are many things relating to the piano-forte which we have not touched upon. There are also some foreign actions to which we have not given much attention, especially those called *down-striking* actions: we have seen these, but are decidedly of opinion that they never will receive sufficient approbation to come into general use: they are much lumbered with parts, and all have a bad touch, which, in the present age of performers, whose effects are so delicate and so rapid, is alone enough to condemn them. Other inventions too, such as Mr. Litherland's patent helical springs to preserve the tuning, Mr. Riley's transposing instrument, Mr. Mott's sostinente, Mr. Kirkman's octave string, and Mr. John Trotter's alternated key-board, have all given place to other things, and are no longer known to the present generation of musical people. Mr. Litherland's plan was a well-tempered *helical spring*, which was to be attached to the loop of the string; thus, as the string contracted the spring gave way, or as it expanded the spring collapsed, by which the pitch of the string was retained and the tuning consequently preserved. It was never adopted to any great extent, but had its admirers: a want of firmness in the tone was perhaps its greatest defect. Mr. Riley's plan for *transposition* was simply a double set of keys, one sliding under the other, by which music might be played from the same scale a note or notes *higher* or *lower*. It was purchased by Messrs. Broadwood, and is now laid aside. It never was calculated to be of service to the practice of music; neither did it introduce any new or valuable idea to the mechanic. Mr. Mott's *sostinente* was an application of a cylinder and silk loops to an upright piano-forte. The loops were attached to the strings, and the cylinder, which was moved by the foot, as it were *bowed* them, and the tones came forth somewhat like the tones of the seraphine. Under Mr. Mott's fingers, this instrument was capable of most pleasing effects, but without such aid, we never esteemed the invention. Mr. Kirkman's *octave string*, was applied as the third string of a grand piano; this string was an octave higher in pitch than the other two, and was somewhat in effect like two diapasons and a principal in an organ, but not so marked in character. It pleased for a time, but is now no more thought of. Mr. Trotter's *alternated key-board* was completed about fifteen years ago. Its peculiarity was that of alternating the keys: thus the octave came within seven white keys; the black keys too were passed *under* the *white*, and finished in front of them *below* with *broad heads;* by which arrangement a black key could be taken by either the *thumb* or the *finger*, at the option of the performer. This instrument was called by Mr. Trotter a *transposing piano-forte;* and he went so far as to promise a *new notation* for it, which notation he seemed to think would do away with the present altogether. That he did not live to perform his promise we much regret; for certainly double sharps and double flats, with all their accidentals, are anything but agreeable to those who cannot devote their whole lives to the study of music.

There is one other point to which we would draw attention, and that is what is called the *bracing* of piano-fortes. Our inquiries have led us to this subject, and we find that in flat instruments, especially grands, there is a difficulty in giving strength to the bracing. Some makers are for iron, and some for wood; but wood, it seems, is inconvenient, and iron is therefore mostly adopted. That strength is important, and very important, is quite clear, when we know that the strings of a grand piano-forte pull equal to a weight of *six tons*. Iron as a substance, doubtless, has the greater strength, but may not wood be so applied as to be strong enough? That wood is more sonorous than iron, there has never, we believe, been a question, and we will yet hope that sooner or later it will be allowed to be a better material. The ingenuity and capital now employed in this interesting branch of manufacture give us some promise that the day is not far distant when a more uniform and successful practice will be adopted in the construction of the piano-forte. If this can be accomplished, what may not be expected from future Hummels and Thalbergs?

PIAPEC, the name of a bird from Senegal, forming the genus *Ptilostomus* of Swainson, intimately related, according to M. Temminck, to his *Corvus gymnocephalus*. This form is placed by Mr. Swainson among his subfamily *Glaucopinæ*, *Wattle* or *Rasorial* crows, in his family *Corvidæ*.

PIASTRE. [MONEY.]

PIAZZA, a term adopted in its original form from the Italian, but with a great change of its meaning; for while in that language it signifies merely an open place, it is employed by us to denote a covered ambulatory, whether formed by columns or arches, in the lower part of a building, such cloistered walks being very common in the *piazze* or public squares of Italian cities, as that of St. Mark's at Venice, &c. Yet, although we have borrowed the term, it has been rather as a distinct name applied in a few particular cases than as a general denomination; for excepting Inigo Jones's arcade, on the north and part of the east side of Covent Garden, which is expressly called the 'Piazza,' we have scarcely another instance in London, such projecting colonnades as those of the Opera House and the Quadrant being different in architectural character, as may instantly be perceived by comparing the last-mentioned with the small piazza beneath the County Fire-Office adjoining to the Quadrant. Though for a different reason, such an arrangement has quite as much to recommend it in this country as in Italy itself; at least for principal thoroughfares and trading streets; because if not required as a protection against the sun, it is desirable as affording dry and sheltered walks and clean pavement in all weathers in those parts of the town where, owing to the crowd and constant traffic, rain and dirt are most annoying to foot-passengers. Accordingly, in his plans for rebuilding the City after the Great Fire, Sir C. Wren proposed to carry piazzas beneath the fronts of the houses of the principal streets; but prejudice or something else determined otherwise; nor has such a highly convenient mode of building, as regards public accommodation, been since adopted in any of the improvements and new streets formed in the vicinity of New London Bridge.

PIAZZA, Town of. [SICILY.]

PIAZZI, JOSEPH, was born at Ponté in the Valteline (Switzerland), July 16, 1746. His education appears to have commenced at Milan, where he assumed the habit of the Théatins, and became an inmate of the convent of St. Anthony. Here and at Turin he studied the classics and mathematics under Tiraboschi and Beccaria, and at Rome under Lesueur and Jacquier, the editors of the Jesuits' edition of the 'Principia.' He began to teach philosophy at Genoa; but having expressed himself too openly on certain theological points, he was threatened with the persecution of the Dominicans, from which he escaped by accepting the professorship of mathematics in the new university of Malta, conferred upon him by the grand-master Pinto. Upon his return to Italy, he became professor of philosophy and mathematics in the College of the Nobles at Ravenna; but here again his religious opinions made him many enemies. Soon after the publication of two philosophical theses, which were deemed 'too bold for so young a divine,' he found it expedient to retire, first to Cremona, and thence to Rome, where he was for some time reader of dogmatic theology at S. André della Valle. In 1780, at the recommendation of Jacquier, he was appointed professor of the higher mathematics in the Academy of Palermo, where, with the co-operation of the viceroy, he founded an astronomical observatory. In 1787 he visited Paris, where he made the acquaintance of Lalande, Jeaurat, Pingré, Delambre, and Bailly; also of John Cassini, Mechain, and Legendre, who were at that time occupied in determining the difference of longitude between the observatories of Paris and Greenwich. He next visited England, where he became intimate with Maskelyne, Herschel, Vince, and more particularly with Ramsden, to whom he confided the construction of the instruments for his new observatory. Much of his time during his stay in England was passed at the observatory of Greenwich. Here, with Dr. Maskelyne, he observed the solar eclipse of June 3, 1788; and the year following he communicated a paper to the Royal Society (*Phil. Trans.*, vol. 79, p. 55), containing the observations of that eclipse by twelve other astronomers, and the consequences thence deduced by himself relative to the longitudes of the several observatories. At that time the longitude of the Dublin observatory was taken at 24^{m} 58^{s}; Piazzi gives 25^{m} $13{\cdot}4^{s}$, and expresses his confidence that this is within two seconds of the truth: the longitude now given in the 'Nautical Almanac' is 25^{m} 22^{s}. This paper is understood to be his earliest production as an astronomer. Having after much importunity obtained the completion of his instruments, he returned with them to Sicily in the latter part of the year 1789, and very soon after became one of the most active and accurate of modern observers. The observatory of Palermo was at that time the most southern in Europe, that at Malta having been recently destroyed by fire. In the course of the first ten years he determined the positions of no less than 6748 stars. His first catalogue was published in 1803, under the title of 'Stellarum Inerrantium Positiones,' which was deservedly honoured by the Academy of Sciences of Paris, and acquired for its author the esteem and admiration of astronomers. It was while thus occupied that he discovered, January 1, 1801, the first of the four planets now known to be situated between the orbits of Mars and Jupiter, and to which he gave the name of Ceres Ferdinandea, out of compliment to his patron the king of Naples. [CERES.] Ferdinand would have commemorated the event by circulating among the astronomers of Europe a gold medal bearing the effigy of Piazzi; but the latter suggested that the money would be more usefully applied in the purchase of an equatorial, of which the observatory was in need.

In 1817 he was called to Naples to put into activity the new observatory erected by Murat on the heights of Capo di Monte. He was succeeded in the observatory of Palermo by M. Cacciatore, to whom he had previously confided the difficult task of re-examining Maskelyne's thirty-six principal stars. The observations of Cacciatore, which were extended to 120 stars, form the basis of Piazzi's second Catalogue of 7646 stars, published in 1814. Speaking of this catalogue, the council of the London Astronomical Society remark, in their seventh annual Report, that 'it exceeds everything of the kind which preceded it, and shows more powerfully than words can express what may be effected by the talents and assiduity of one individual.' Piazzi was a member of the principal scientific societies of Italy, France, and Germany. Of the Royal Society of London he was elected a fellow in 1804, at the same time with Baron Zach and Professor Gauss. He died at Naples, July 22, 1826. His library and instruments he bequeathed to the observatory of Palermo, and a liberal annuity in perpetuity, to be appropriated in succession to the education and maintenance of young men who evince a marked partiality for astronomical science.

The preceding notice is chiefly drawn from an article in the 'Bulletin des Sciences' for 1826, drawn up by De Angelis under the eye of the Baron Zach. A more detailed account of Piazzi's life and labours has long been expected from the pen of his friend Colonel Visconti, the present director of the geographical engineers at Naples. The published works of Piazzi mentioned in different numbers of the 'Bulletin des Sciences' are collected and appended to a translation of the above article in Brewster's 'Journal' for 1827 (vol. vi., p. 193). They are as under:—

1, 'Discourse on Astronomy,' Paler., 1790.

2, 'Description of the Observatory of Palermo,' in 9 books, of which four were published in 1792 and five in 1794.

3, 'On the Discovery of the Planet Ceres,' Palermo, 1802.

4, 'Observations on the Obliquity of the Ecliptic,' 1804. (*Mem. Soc. Italiana*, tom. xi.)

5, 'On the Precession of the Equinoxes,' 1804. (*Ephem. de Milan.*)

6, 'On the Parallax of some of the Fixed Stars.' (*Mem. Soc. Italiana*, xii.)

7, 'On the Measure of the Tropical Year.' (*Id.*, tome xiii.)

8, 'On the Proper Motion of the Fixed Stars.' (*Mem. de l'Inst. Nat. Ital.*, tome i.)

9, 'The Metrical System for Sicily,' 1812.

10, 'Lessons in Astronomy,' 1817.

11, 'On the Observed and Calculated Solstices.' (*Mem. de l'Inst. de Milan*, tome ii.)

12, 'On the Italian and European Clock.' (*Giorn. de Scienze par la Sicilia*, Aug., 1824.)

13, 'On the Progress of Astronomy.' (*Giorn. de Soc. Lett. et Arti par la Sicilia*, April, 1824.)

14, 'Description of the Meridian of the Cathedral of Palermo, established by Piazzi in 1798,' by M. Cacciatore. (*Id.*, August, 1824.)

PIBROCH, in Scottish music, the march or battle-tune of the Highland clans.

PICA. [CORVIDÆ, vol. viii., p. 68; MAGPIE.]

PICAMAR, a peculiar compound obtained by Reichenbach from wood-tar.

Its properties are—that it is nearly colourless, limpid, and transparent; it has the consistence of a thickish oil; to the touch it is greasy; its smell is not very strong or disagreeable, but it is peculiar; the taste of picamar (*in pice amarum*) is intolerably bitter, and at first burning, but afterwards cooling, like peppermint. Its specific gravity is about 1·10. At common temperatures oxygen has no sensible action on picamar; even when it has been long exposed to the air, it becomes only slightly yellowish, but when boiled in contact with it, it becomes gradually brown; its boiling point is about 545°. In water, whether cold or hot, it dissolves sparingly, and the solution has no effect either on litmus or turmeric paper.

It dissolves in acetic acid, and the bitterness of pyroligneous acid is derived from its presence. Alcohol, æther, pyroxylic spirit, and creosote dissolve it readily. It dissolves sulphur, phosphorus, and selenium, and, when hot, caoutchouc also, but this is deposited as it cools. In cold sulphuric acid it dissolves without decomposition, but this takes place when they are heated together. By nitric acid it is decomposed, and a reddish brown mass is formed, but without any oxalic acid.

Picamar combines with ammonia, soda, lime, and barytes, and with potash it forms a crystalline compound which is nearly insoluble in alcohol; but when it is diluted and heated, it takes up a large quantity of this compound, which on cooling separates in white brilliant crystals.

It has not been analyzed, and has not as yet been applied to any useful purpose; but it has been suggested that it may be usefully employed in preventing steel instruments from rusting.

PICARD, JEAN, was born 21st July, 1620, at La Flèche in the present department of the Sarthe, and became priest and prior of Rille in the same department. Scarcely anything is known of his early history. Even the names of his parents appear to have been forgotten, as they are not mentioned by Lalande, who visited his birth-place. Pezenas, in his 'Critical History of the Discovery of the Longitude,' referred to by Delambre, speaks of one Picard, a gardener of the duke of Crequi, whom the astronomer Le Valois instructed so successfully in the use of astronomical instruments, that he became one of the most celebrated observers of his age. As the subject of this article is the only Picard who is known to have acquired any celebrity as an astronomical observer, it may be conjectured that he was the humble individual here alluded to. The earliest event with which his name is associated, and of which the date is recorded, is the solar eclipse of 25th August, 1645, which he observed with the astronomer Gassendi, whom he succeeded, in 1655, as professor of astronomy in the College Royal of France. He was one of the eight individuals selected by Colbert, in 1666, to originate the Academy of Sciences. The following year he made his first application of the telescope to the measurement of angles; which alone, observes Delambre, would entitle him to the esteem and remembrance of astronomers. Prior to this, plain sights only had been used, with which not only are distant objects frequently altogether invisible, but of those which can be seen the outline is seldom distinctly defined, while in some cases, as in the fixed stars, they have an apparent magnitude which they do not really possess. According to Lahire however the merit of this great improvement (which was eagerly adopted by every astronomer of note, Hevelius excepted) is divided between Picard and Auzout, who were in partnership, though, from Picard's description of his invention, in his work entitled 'Figure de la Terre,' it would appear to be exclusively due to himself. Soon after this he introduced an entirely new system of astronomical observation, wherein the pendulum, then recently invented by Huyghens, is first brought into use in determining the right ascension of the stars by noting the instant of their passage across the meridian. [TRANSIT INSTRUMENT.] This method, observes Delambre, which is adhered to at the present day, 'insures to those two authors, Huyghens and Picard, an incontestible superiority over all the astronomers of the time without a single exception.' In the memoir wherein these views are more fully developed, and which he read before the Academy of Sciences, in April, 1670, he urges the necessity of forming more correct tables of the sun and fixed stars, as also tables of refraction, which he regarded as the chief foundation of all sound practical astronomy. For this purpose he solicited the erection of a mural quadrant, which after many years of needless delay was finally adjusted in the plane of the meridian, not however till Picard was upon his death-bed. In 1671, with a view to give astronomers greater confidence in employing the observations of Tycho Brahé, Picard visited the island of Hoëne in order to determine the position of Uraniberg. Scarcely a vestige of the observatory remained; sufficient however to enable him to detect an error of one minute in the latitude and several minutes in the longitude, as given by Tycho, which confirmed the suspicions previously entertained by astronomers. While absent on this occasion he met with Röemer, then a young man, with whose mathematical talents he was so well pleased that he brought him to Paris and introduced him to the academy. The observatory of Paris, the plan of which had been furnished by Picard, was completed in 1671, when it was immediately occupied by Dominic Cassini, who, at Picard's recommendation, had been invited by Colbert to take up his residence in France. It was not till two years later that inferior accommodation within the same building was allotted to Picard. 'He saw,' says Delambre, 'all his projects neglected or their execution deferred; all expenditure and encouragement lavished upon objects of less utility, though to the eye of the vulgar of a more brilliant character, such as the rotation of the three planets, and the four new satellites of Saturn; while telescopes of great cost were imported from Italy to verify these discoveries, which, though certainly very curious, were and always will be useless.' The astronomical ephemeris entitled 'La Connaissance des Temps,' originated with Picard in 1679, and was continued by him till his death. The same year he was nominated with Lahire, by the king, to conduct certain surveys along the coast of Gascony, the result of which sufficiently indicated the necessity of constructing an entirely new map of the country. For this purpose he proposed the extension of the arc of the meridian passing through the Paris observatory as far as the extremities of the kingdom: a proposal which has since been carried into effect. As an observer, he was no less industrious and accurate than, as a philosopher, he was enlightened. His observations from 1666 to 1682, collected and published by Lemonnier in 1741, under the title of 'Histoire Céleste,' are a sufficient proof of his activity; while his perseverance for ten years in observing the minute variations which, from causes then unknown, are continually taking place in the altitude of the polar star, is equally conclusive as to his zeal and the perfection which astronomical observation attained in his hand.

What Picard is however now chiefly remembered for, is his measurement of an arc of the meridian of Paris between Amiens and Malvoisine. This was begun in 1669, and forms the subject of his work entitled 'Mésure de la Terre,' Paris, 1671, a large folio of 30 pages. The base extended along a paved road from Villejuive to Juvisy; it was twice measured, the results being $5662\frac{5}{6}$ and $5663\frac{1}{6}$ toises, the mean of which was taken. The difference between the latitudes of Amiens and Malvoisine he found to be 1° 22′ 55″, and the length of the intermediate arc 78,850 toises; whence it followed that the length of one degree between those latitudes was 57,057. The toise employed was that of Chastelet. 'Lest,' says Picard, 'this toise should share the fate of those employed in former surveys, of which only the name remains (it has since been lost), we will connect it with a measure which, being taken from nature herself, *must be invariable and universal.*' He then states that he determined with great care the length of the pendulum vibrating seconds (which he supposed was constant for all latitudes), and which at Paris he found to be 440·5 lignes, according to the toise of Chastelet. (*Mésure de la Terre*, p. 4.) The most accurate determinations which have since been made do not differ from this result by so much as the $\frac{6}{100}$ of a ligne. (Francœur, *Géomorphie*, p. 256.) At the date of this survey the law of refraction was imperfectly known, and its effects were neglected. The effects arising from what have since been termed aberration and nutation [ABERRATION; PRECESSION AND NUTATION] had been felt, but astronomers then, and for more than half a century afterwards, knew not how the requisite corrections should be applied. These were therefore sources of error which vitiated the observations of Picard in common with those of all other astronomers of that time; and in addition an error of six toises was committed in the measurement of the base. The whole of the operations have since been repeated by Lemonnier (*Degré du Meridien*, Paris, 8vo., 1740) and Lacaille, and still more recently by Delambre. The final result gives 57,074 toises for the length of the degree, which differs from Picard's by 17 toises (35·6 English feet); and, thus rectified, this measurement is one of those on which the greatest reliance is now placed. The care with which the whole of Picard's operations were conducted, and the superiority of his instruments and methods over those employed in any previous survey, naturally produced considerable confidence in his result. Astronomers would not indeed have been justified had they regarded the results of former surveys in any other light than rough approximations which enabled them to assign the limits within which the true dimensions of the earth would one day be found, but which were useless in determining what its dimensions and figure really were. Newton, in 1666, failed to establish the truth of his theory of gravitation by employing an erroneous measure of the earth's radius, and did not resume its consideration till he heard of Picard's survey, by which it was confirmed. Norwood's measurement of the arc of the meridian between London and York, which took place in 1633, gave results which have since been shown to be correct, and were doubtless known to Newton. But his measurement differed too considerably from those which preceded it to be admitted on the strength of the imperfect apparatus employed by him. Norwood's measure is called by Delambre a great piece of good fortune. [Norwood.]

Picard died at Paris, 12th July, 1682 (Delambre): according to other authorities, his death took place in 1683 or 1684. Besides the works already mentioned, the following are inserted in the 'Memoirs' of the Academy of Sciences. The numbers refer to the volume:—

vi. De la Pratique des Grands Cadrans par le Calcul: De Mensuris; De Mensurâ Liquidorum et Aridorum; De Proportione Aquarum Effluentium; Fragments on Dioptrics; Treatise on Levelling. All but the last are in the 'Divers Ouvrages,' &c., fol., Paris, 1693.

vii. Measurement of the Earth; Astronomical Observations made in Denmark; Astronomical Observations made in various parts of France (4 papers).

x. Immersion and Emersion of Jupiter's Satellites observed at Paris in 1668; Observation of the Lunar Eclipses of 7th July, 1675, and 11th January, 1676, by Cassini, Picard, and Roemer (2 papers); Experiments relative to the Phenomenon observed in the Vacuum of the Barometer; Occultation of Saturn by the Moon, observed by Cassini, Picard, Roemer, and De La Hire.

(Delambre, *Astronomie Moderne*, and *Biographie Universelle*; Lalande, *Biographie Astronomique*; Condorcet, *Eloge de Picard*; Fontenelle's *Eloge de Picard*; Montucla, *Hist. des Mathématiques*, &c.)

PICARD, LOUIS BENOIT, member of the French academy, and one of the most talented and successful dramatists of his age, was born at Paris, in 1769. His first production for the stage (in writing for which he was guided at the outset by the advice and instructions of his friend Andrieux, the author of 'Les Etourdis,' and several other popular pieces) was 'Le Badinage Dangereux,' which was followed by a very long succession of comedies, displaying novelty in their subjects, faithful and well hit off portraitures of contemporary manners, playfulness of dialogue, and clever traits of satire; to such degree indeed that by some he has been styled the Molière of his day. Not only were his productions eminently popular at home, but many of them were either translated or remodelled by Iffland, Hell, and other German writers. Among his pieces in verse, 'Mediocre et Rampant,' 'Le Mari Ambitieux,' and 'Les Amis de Collège,' are generally considered his best; while the 'Contrat d'Union,' 'La Petite Ville,' and 'Les Marionettes' are regarded as his master-pieces among those in prose. Besides their literary merits and the strong comic talent they evince, it is not the least recommendation of Picard's dramas that they have for the most part a useful moral aim and tendency. Numerous as are his productions of this class, they by no means constitute the whole of his literary compositions, for he likewise wrote the 'Gil Blas de la Révolution,' and several other novels which obtained considerable vogue. Among these, 'L'Honnête Homme' has been translated into English under the title of 'The Novice, or Man of Integrity;' and although exaggerated in the chief character, it contains several striking and well-drawn scenes replete with latent satire. In addition to these various labours with his pen, Picard was at one time a performer at the Théâtre Louvois, and from 1801 director of that theatre. He was afterwards successively manager of the Opera and the Odeon theatre, which latter post he continued to hold when that house was rebuilt after being burnt down in March, 1818. He died December 31st, 1828.

PICARDIE (LA), a maritime province of France, constituting one of the military governments into which, before the Revolution, that kingdom was divided. It was bounded on the north-east by Artois and Flandre Française (French Flanders), on the east by Champagne, on the south by the Île de France, on the south-west by Normandie, and on the west and north-west by La Manche, or the English Channel. Its form was very irregular. The part south of the river Authie had its chief extension from west to east, about 145 miles from the mouth of the little river Bresle (which divided Picardie from Normandie) to the neighbourhood of Rocroy in Champagne; but the breadth of this portion from north to south was in no part greater than 60 miles, and generally was much less. A narrow strip of the province projected from this southern part along the coast, about 50 miles northward from the Authie, but not having in any part a much greater extension inland from west to east than 20 miles.

The province above described was sometimes distinguished as Picardie Septentrionale (Northern Picardie), in order to distinguish it from the districts of Beauvaisis, Valois, Soissonnais, Laonnais, and Noyonnais, to which, though included in the military government of the Ile de France, the name of Picardie Méridionale was sometimes given. The etymology of the name Picardie, and the time when it first came into use, are uncertain: there is no evidence that it was employed before the twelfth or perhaps the thirteenth century. This province had no feudal unity, and therefore no history to be recorded here; a brief notice of the changes to which it has been subject will be found under the departments into which it is now divided. [Pas de Calais; Somme.]

Picardie was divided into Haute and Basse, Upper and Lower. Haute or Upper Picardie (in which Picardie Méridionale was included), comprehended the districts of (1) Amiénais, chief town Amiens (population 45,001); (2) Santerre, chief town Péronne (population 3802); (3) Vermandais, chief town St. Quentin (population 17,686); and (4) Thiérache, chief town Guise (population 3072). The districts of Picardie Méridionale are mentioned above. Amiénais, Vermandais, Beauvaisis, and Soissonnais preserve respectively the designations of the Belgic nations by which they were inhabited; the Ambiani, the Veromandui, the Bellovaci, and the Suessiones. Basse or Lower Picardie comprehended the three districts of Le Calaisis, Le Boulonnais, and the county of Ponthieu, of which the capitals were respectively Calais (population 10,437), Boulogne (population 20,856), and Abbeville (population 19,162); Le Calaisis was sometimes designated Le Pays Reconquis on account of its recovery (A.D. 1558) from the English, by whom it had been long held. Le Boulonnais was sometimes divided into Haut and Bas, the former having Etaples for its chief town, the latter Boulogne. Le Ponthieu was subdivided into Ponthieu, properly so called, chief town Abbeville; the county of Montreuil, chief town Montreuil (population 4083); the district of Marquenterre, chief town Quend-le-Jeune; and the district of Vimeux, chief town St. Valery-sur-Somme (population 3265) A small part of the eastern extremity of Picardie is included in the department of Aisne.

The population given above is that of the communes, from the census of 1831.

PICCI'NI, NICOLO, was born at Bari in the Neapolitan dominions, in 1728. His father, a musician, intended him for the church, but the predilection of the son for his parent's profession was too strong to be overcome, and at the age of fourteen he was entered at the Conservatorio *Santo Onofrio*, where he completed his studies under Leo and Durante. The first marked proof of his genius for composition was evinced in his serious opera *Zenobia*, produced at the theatre *San Carlo* in 1756. This led to his being invited to Rome, where he brought out *Alessandro nell' Indie*, which was eminently successful. Four years after appeared, in the same city, his comic opera, *La buona Figliuola*, the drama by Goldoni, founded on Richardson's *Pamela*, which was, and ever will be, considered as Piccini's masterpiece, and be admired for the originality, the beauty, and the appropriateness of its airs, as well as for the judicious manner in which the accompaniments are written, simple as they are, compared with those of a later age. It saved the manager of the *Teatro delle Dame* at Rome from ruin, and excited a degree of enthusiasm amounting to extravagance: dresses, wines, nay buildings, took the name of the principal character in the piece, *La Cecchina;* and during several years the fireworks displayed on the festival of the patron saint of the city exhibited scenes from the opera, which was the favourite of all ranks. This was given in London in 1766, with an effect but little less than it had produced at Rome. Next year saw his *Olimpiade,* in which is the aria 'Se circa, se dice,' a chef-d'œuvre. He now was applied to from all quarters in Italy to furnish the various theatres with operas, and he composed many, most of which were very successful, though now forgotten, a circumstance which ought to excite no surprise, as we are informed by M. Ginguené that in the short space of a few years he had produced one hundred and thirty-four operas, besides a vast number of masses, cantatas, and detached pieces.

Piccini having received a pressing invitation to Paris, arrived there in 1776, and prepared himself to compose for the *Académie Royale de Musique.* His first difficulty was an utter ignorance of the French language; but Marmontel, by becoming his instructor, soon removed this impediment. He next had to contend against national prejudices, and also very formidable rivals, namely Gluck, and afterwards Sacchini. For some account of the musical feuds in Paris to which his visit gave rise, we must refer to our notice of GLUCK. His *Roland*—a drama by Quinault—by which he introduced himself to a Parisian audience, met with every possible success, and though it led to a furious war among the connoisseurs as well as amateurs of all degrees, the composer was, by its means, firmly established in the French capital, and chosen as director of *L'Ecole de Chant,* having previously been appointed singing-master to the queen.

The Revolution drove Piccini back to Naples, after losing nearly all his property. He was at first received with smiles by his own sovereign, but having carried with him to his native country political opinions not likely to be pleasing to the ears of an absolute monarch, and which he had the imprudence to pour into them, he was disgraced, proscribed, and placed under the surveillance of the police. In 1798 he contrived to return to Paris, where his friends obtained for him a pension of 5000 francs, besides a gratuity of 2400 more from the society *Des Encouragemens Littéraires,* with the addition of apartments in the Hôtel d'Angivillier. His various anxieties however brought on a paralytic affection, from which he recovered, and was received with kindness by the First Consul, who appointed him inspector of the *Conservatoire de Musique.* But shortly after, oppressed by domestic afflictions, he experienced a return of his former attack, under which he finally sunk in 1800, and was interred at Passy, where a handsome tomb is erected to his memory.

PICCOLOMINI FAMILY. [PIUS II.]

PICCOLO'MINI, ALEXANDER, born at Siena in 1508, died 1578. He was titular archbishop of Patras, and coadjutor of the archbishop of his native place. No events of his life are particularly worth recording, but the wide extent of his writings, and the esteem in which they were held by his contemporaries and immediate followers, make his name remarkable. He was moreover of an original turn, and his writings are almost all in Italian, so that he is among the earliest of those who endeavoured to raise the character of vernacular literature, by treating all branches of knowledge in modern tongues. His commentaries on Aristotle were prized for their good sense and for their abandonment of most of the scholasticisms which have since procured for that philosophy an undeservedly bad reputation. He advocated (in 1578) the reformation of the Calendar, which was afterwards adopted. In his book on the fixed stars and the sphere, he adopts the mode of designating the stars by letters; a small matter, but one which makes the greater part of the immortality of Bayer, and to which the diagrams of Piccolomini establish his prior claim. His works are of a most miscellaneous character—astronomy, physics, comedies, sonnets, morals, divinity, and commentaries on Aristotle. De Thou speaks in strong terms of the rare union of diversity and depth which his acquirements presented.

PICE'NUM. [MARCA D'ANCONA.]

PICHEGRU, CHARLES, a general of the French republic, was born of humble parents, in 1761, at Arbois in Franche-Comté. He studied at the college of Brienne, enlisted as a common soldier, and accompanied his regiment to America. On his return he was promoted to be serjeant-major. He embraced the principles of the revolution, and in 1793 commanded the army of the Rhine. In the following year (1794) he succeeded General Hoche in the command of the army of the North, which was in a state of great disorder. M. Thiers says of him—'He possessed spirit and resolution, but his military genius did not rise above mediocrity.' Be that as it may, he restored order and discipline in the army, and when the French went into winter-quarters, they were masters of the whole country to the line of the river Wahl, excepting Nimeguen, the isle of Bommel, and Breda. The winter proved exceedingly severe, and as soon as the ice was sufficiently strong to bear artillery, Pichegru made a simultaneous and completely successful attack on the above places, and crossed the Wahl in January, 1795. The English were obliged to embark, the prince of Orange abandoned his army, and recommending the states to make no more resistance, fled to England, and nothing remained for the French but to take possession of the entire country. The plan of the early part of the campaign is said to have been traced out by Carnot, but Pichegru deserves the reputation that he gained by the energy and foresight he displayed in this winter campaign. On his return to Paris, he was appointed general of the army of Paris during the insurrection of the fauxbourgs in April, 1795, and, by the confidence with which his presence inspired the troops, he mainly contributed to restore tranquillity. He then joined the army of the Rhine, where he entered into correspondence with the prince of Condé, with a view of restoring the Bourbons to the throne. His treason being shortly suspected, he was superseded in the command of the army of the Rhine by Moreau, in 1796. The embassy to Sweden was offered to him and declined, and he retired to Jura, for which department he was elected in 1797. Thiers says 'he had too much tact and was too prudent to conceive any project of counter-revolution at this time; but he received the royalists' money, and gave in return plenty of promises.' He next became president of the Council of Five Hundred, and being detected in a conspiracy to overthrow the republican party, he was arrested September 4, 1797, sent to the Temple, and, with Barthelemy, Willot, and several more, immediately transported to Cayenne. After eight months he made his escape to England, where he was well received as a partisan of the Bourbons. In 1804, Pichegru and Georges Cadoudal were employed with several of the Vendean leaders to organise a plot to overthrow the government of the First Consul. Being detected by the police, Pichegru was arrested at Paris on the 17th February, and sent to the Temple. While a process was being commenced against him, he was found, on the morning of the 6th April, 1804, strangled. An attempt was made to affix the stigma of his murder on Bonaparte, but there do not seem to be grounds sufficient to establish this charge. (Thiers, *Hist. de la Revolution; Biog. Universelle.*)

PI'CIDÆ. [WOODPECKERS.]

PICO. [AZORES.]

PICO, GIOVANNI DELLA MIRA'NDOLA, born in 1463, was the son of Giovanni Francesco Pico, count and sovereign of the little state of Mirandola and Concordia, which now forms part of the Modenese territory. [MODENA, DUCHY OF.] He was a precocious youth, and gifted with a prodigious memory; he studied almost every branch of learning which was then taught, philosophy, law, philology, general literature, and poetry. He learned Latin, Greek, Hebrew, Chaldaic, and Arabic. With regard to philosophy, he followed the Platonic, or rather the Neo-Platonic, or Alexandrine school. He travelled through France and Italy, and sustained public scholastic disputations in several universities. He was pleased to argue on both sides of a question, and he thus acquired a wonderful reputation for learning. When twenty-three years of age he went to Rome, where he drew up nine hundred propositions on all kinds of subjects, logic, ethics, physics, metaphysics, theology, mathematics, astrology, and the cabbala, inviting all the learned of Europe to argue with him upon each and all of them. This challenge was accepted in some instances, in which he is said to have come off victorious. But this display of erudition was not without danger, especially in that age. Out of the 900 propositions, 13 were picked out by officious persons which savoured of heresy, or incredulity, or something of the kind, and were denounced to Pope Innocent VIII., who ordered a strict inquiry upon so grave a subject. Pico wrote his defence, which was drawn up with great modesty, and in which he professed his submissive orthodoxy. In conclusion the pope condemned the propositions, but acquitted the author of any heretical intention. One of these propositions referred to the eternity of punishments in the next world. Pico maintained that sin, being finite, could not be subject to an infinite penalty, but he afterwards modified his proposition by saying that ‘sin includes two offences, one the gratification of a passion, which is finite, and another, the contempt of the grace of God and eternal happiness, which are infinite, and therefore may on the second account deserve an infinite punishment.’

At last Pico chose Florence for his residence, being attracted thither by the renown of Lorenzo de' Medici and his friends. (Machiavelli, *Stor. Fiorent.*, vi.) He there disputed and wrote upon the Platonic philosophy, which he strove to reconcile with the scriptures. He also wrote a work against astrology, in 12 books, which is perhaps the best of his writings, and likewise a dissertation on antient mythology, and a commentary on the book of Genesis. His works have long since been forgotten. He died at Florence, in November, 1494, at the age of thirty-two, on the very day that Charles VIII. of France entered that city. His nephew Gian Francesco Pico wrote his biography.

PICROLITE, a mineral which occurs massive, with a thin fibrous radiated structure. Colour leek or yellowish green. Fracture splintery. Hardness 3·5 to 4. Opaque, or translucent on the edges. Lustre slight, but somewhat pearly. Before the blowpipe it colours borax green, the colour disappearing on cooling. This mineral is found at Taberg and Nordmorken in Sweden, traversing beds of magnetic iron-ore. It is stated also to have occurred at Reichenstein in Silesia. Analysis by Klaproth:

Silica	40·04
Carbonic acid . . .	4·70
Magnesia . . .	38·80
Protoxide of iron . .	8·28
Water	9·08
	100·90

PICROSMINE, a mineral which occurs crystallized and also massive.

Primary form a right rhombic prism. Fracture indistinct, uneven. Hardness 2·5 to 3. Nearly opaque. Lustre dull; vitreous. Colour greenish white, or sometimes dark green or even blackish. Streak white and dull. Specific gravity 2·58 to 2·66.

Before the blowpipe it gives out water, but does not melt; it becomes black, and then white and opaque, and acquires a hardness = 5.

Massive Varieties.—Structure thin, fibrous; fracture splintery; granular to compact.

Found in the iron-mine of Englesburg near Presnitz in Bohemia. According to Magnus, it consists of

Silica	54·88
Magnesia . . .	33·34
Protoxide of iron . .	1·39
Protoxide of manganese .	0·42
Water	7·30
	97·33

PICROTOXIN, the principle to which *cocculus indicus* owes its deleterious properties. It is extracted by the action of water and alcohol, and eventually crystallized.

The properties of picrotoxin are, that its crystals are usually acicular, but sometimes filamentous, in plates and in hard granular crystals. It is intensely bitter, is soluble in 150 times its weight of cold water, and 25 times when boiling. Alcohol of specific gravity 0·810 dissolves one-third of its weight, and sulphuric æther of the specific gravity of 0·7 takes up two-fifths of its weight; in oils it does not dissolve.

It does not act upon test papers, thus evincing the properties neither of an acid nor an alkali, though it was once supposed to possess those of the latter. The acids do not appear to increase its solubility in water, but the alkaline bodies do possess this property, to a considerable extent, and it is precipitated from them by the addition of acids.

According to Pelletier and Couerbe, it consists of—

Hydrogen . .	6·00
Carbon . . .	60·91
Oxygen . . .	33·09
	100·

PICTOR, FABIUS. [Fabius Pictor.]

PICTS, an antient people of North Britain, whose origin and history are singularly obscure, and have furnished matter for endless speculation and controversy. The name does not occur in the enumeration of the British tribes given by Ptolemy in the beginning of the second century; nor are the Picts noticed by his successors Dion Cassius and Herodian, the latter of whom wrote about A.D. 250, any more than they are by his predecessors Julius Cæsar and Tacitus. This has not prevented some writers from maintaining that the Picts were settled in Britain before Cæsar's invasion; that is, for instance, the opinion of Pinkerton; but it is certainly at least in the highest degree improbable that they should have been passed over by Ptolemy if they were here in his time. The earliest mention of them by any antient writer occurs in an oration addressed by the rhetorician Eumenius to the emperor Constantius Chlorus, on his return from his victory over the usurper Allectus, in the year 296. [Constantius I.] Eumenius there speaks of the Britanni in the time of Julius Cæsar (according to the best reading of the passage) as ‘Solis ... Pictis modo et Hibernis adsueti hostibus’—having been used only to the Picts and Irish as enemies. All however that we can infer from this expression is, that the name of the Picts was familiar to Eumenius at the end of the third century; it would be demanding far too much historic precision from a mere declaimer to assume on such authority that it was equally well known to Cæsar three hundred and fifty years before. The same Eumenius, in another panegyrical oration addressed to Constantine the Great, the son of Constantius, in 310, again mentions the Picts, and this time seems to use the word as the generic name for all the northern British tribes; ‘non dico Caledonum, aliorumque Pictorum, silvas et paludes,’ are his words. This expression has principally led the majority of inquirers to the conclusion that the Caledonii (or Caledones, as they are here called) were really the same people with the Picts. As Pinkerton, who himself adopts this opinion, observes, ‘Buchanan, Camden, Lloyd, Innes, Whitaker, the Macphersons, O'Conor, D'Anville, though differing widely in other points, all join here.’ But this again appears to be attributing to a rhetorical sentence-maker a great deal too much weight as an historic authority. Besides, the words Eumenius uses would imply, not that the Picts were the same with the Caledonians, but that the Caledonians were in fact only a tribe of Picts—although both Tacitus and Ptolemy, who were well acquainted with the former, appear to have been entirely ignorant of the existence of the latter. In truth, all that can be safely deduced from this passage of Eumenius is merely that the Caledonians and Picts were then the most distinguished among the barbarous tribes inhabiting the woods and marshes of North Britain.

After the time of Eumenius we have frequent mention of the Picts in the Roman writers. Ammianus Marcellinus, under the year 360, speaks of the invasion of the borders of the Roman province in Britain by those wild nations the Scots and Picts—‘Scotorum Pictorumque, gentium ferarum.’ Again, in 364, he enumerates the ‘Picti, Saxonesque, et Scotti, et Attacotti,’ as harassing the Britanni with incessant attacks. We may just observe that the Scoti or Scotti mentioned in these two passages were in all probability not yet inhabitants of any part of Britain any more than were the Saxones. But the most important passage in Marcellinus relating to the Picts, although it refers to another probably still more important, which is unfortunately lost, occurs in his annals of the year 368, where he says that, in relating the actions of the emperor Constans (A.D. 337-350), he had already described as well as he could the situation of Britain, and that therefore it is necessary for him only to observe now, that at that time ‘Picti, in duas gentes divisi, Dicaledonas et Vecturiones, itidemque Attacotti, bellicosa hominum natio, et Scotti per diversa vagantes, multa populabantur.’ It thus appears that about the middle of the fourth century the Picts were understood to be divided into two tribes, the Dicaledonæ, or Dicaledones, and the Vecturiones. These two names have however occasioned much perplexity. The Vecturiones, or Vecturones, indeed, are mentioned by Richard of Cirencester, whose work however is possibly nothing more than a modern forgery; but the name Dicaledones occurs nowhere but in this passage of Marcellinus. It has been conjectured that the true word was probably Deucaledones, and with this emendation an interpretation of both names has been given which is at least ingenious and plausible. 'The term *Caledonii*,' says a late writer, 'is evidently *Caoilldaoin*, men of the woods, modified by Roman pronunciation. The term *Deucaledones* is attended with no difficulty. *Duchaoilldaoin* signifies, in the Gaelic language, the real or genuine inhabitants of the woods. *Du*, pronounced short, signifies black, but pronounced long, signifies real, genuine; and in this acceptation the word is in common use: *Du Erinnach*, a genuine Irishman; *Du Albinnach*, a genuine Scotsman. The appellation of *Deucaledones* served to distinguish the inhabitants of the woody valleys of Albinn, or Scotland, from those of the cleared country on the east coast of Albinn, along its whole extent, to certain distances westward towards the mountains in the interior parts of the country. These last were denominated, according to Latin pronunciation, *Vecturiones;* but in the mouths of the Gael, or native inhabitants, the appellation was pronounced *Uachtarich*. . . . That a portion of the country was known in antient times by *Uachtar* is evinced by the name of the well-known range of hills called *Druim-Uachtar*, from which the country descends in every direction towards the inhabited regions on all sides of that mountainous range.' (Grant's *Origin of the Gael*, pp. 276, 277.) Although however Marcellinus thus appears, as well as Eumenius, to regard the Caledonians as only a tribe of the Picts, it is probable that this is a mistake, arising naturally enough merely from the ascendency in the country that had been acquired by the latter. The Vecturiones in all probability were the only true Picts; the Dicaledones were another race altogether.

It is very doubtful indeed in how far we are to understand the Roman writers as meaning at all the same people we now call the Picts by their term *Picti*. That term seems always to have been used by them in the sense simply of painted men, rather than as the name of any particular people. At least this notion, which we find Claudian indicating in his 'nec falso nomine Pictos' (*De Text. Cons. Honorii*), and in other passages, seems always to have been suggested to them by the name, and to have therefore induced them to apply it loosely to all the wild inhabitants of the north of Britain who were in the habit of painting their bodies, or rather among whom they supposed that practice to exist. If any one of the North British nations, more especially if any one distinguished above the rest, bore an appellation somewhat resembling this term *Picti*, the Romans, with their usual carelessness as to such matters, would readily enough employ *Picti* as their translation of the native name, and, even although the people particularly indicated in the first instance might be remarkable among their neighbours for their superior civilization and for *not* painting their bodies, would still retain in that application the popular sense of the epithet, and would soon come to extend it as far over other tribes, no matter how different in real character and origin, as that notion would seem to justify. We believe this to be the actual history of the use of the term Picti in the Roman ethnography of Britain.

That there was in early times a people settled in North Britain bearing a name of which the Latin *Picti* was intended as the representative, may be pronounced to be a fact only to be disputed by that sort of scepticism which is not less hostile to the investigation and establishment of historic truth than the weakest credulity. They are mentioned under the name of Picti not only by Eumenius, Marcellinus, Claudian, and other Roman writers, but by Gildas, Nennius, Bede, and Paul Warnfrid (Paulus Diaconus), all of whom lived while the Pictish kingdom still subsisted in the country now called Scotland; Bede even gives a history of the first settlement of the Picts in North Britain, which may be correct or not, or partly truth, partly fable, but which agrees in some remarkable points with the accounts both of the Irish and of the Norwegian or Icelandic annalists; the Saxon Chronicler and other contemporary writers of that nation speak of them under the names of *Peohtas, Pyhtas, Pihtum,* and *Pehiti;* the Welsh historical fragments call them *Phichtjaid;* the Icelandic writers, *Pets;* the antient Irish annalists, *Cruithne*—a name which, differing as it does from the others that have been enumerated, is sufficiently ascertained to indicate the same people: and popular tradition in Scotland still remembers them under the name of *Pechs* (pronounced with a deep and prolonged guttural intonation), which is probably as near their true name as any of the other forms.

The main dispute with regard to the Picts, as with regard to the Caledonians, with whom they have been sometimes identified, the Scots, the Cimbri of antiquity, and the Cymry or modern Welsh, the Belgæ and the Irish Firbolgs, has been, whether they were a Celtic or a Teutonic people. Their Teutonic lineage is maintained by Usher, Stillingfleet, and Pinkerton; that they were Celts is the opinion of Camden, Bishop Lloyd, Father Innes, George Chalmers, Ritson, and others. The historic evidence that bears upon the point does not amount to much; all that can be said is, that the various old legendary accounts all make them to have come to Britain from Scythia or from Scandinavia. But the most curious and valuable fact that we possess in relation to this matter is, that their language appears to have nearly resembled the Welsh. One Pictish word only has been expressly mentioned by any old writer. *Peanvahel*, Bede tells us, was the Pictish name of the place at which the wall of Antoninus terminated on the Forth, and which Nennius says was called in Welsh *Pengaaul* (Pengual?), and in Scotch (*Scotice*) *Cenail*. It is still in fact known by the name of Kinneil. *Cen*, or *Cean*, is the Irish or Gaelic word for a head, and Cenail in that dialect would mean the head of the wall; and that is also the signification of the Welsh name, with which the Pictish is evidently identical.[*] And generally it appears that the antient names of places in those parts of Scotland formerly occupied by the Picts are Welsh, as was long ago pointed out by Camden, and has been since more fully established by the late George Chalmers, in his 'Caledonia.' On the other hand, it is remarkable that the most antient names of places in Wales are not Welsh, but Irish. This was stated by Humphrey Lhuyd nearly three centuries ago, and is, we believe, generally admitted by Welsh antiquaries. These two facts put together would lead to a suspicion, which is not uncorroborated by other circumstances, that the same people which formerly occupied Pictland in North Britain, or a people of the same race, are now the occupants of Wales, where they had displaced or supervened upon a previous population speaking the same language with the Celts of Ireland and the Highlands of Scotland; in other words, that the modern Welsh are a remnant of the Picts. This was the opinion of the judicious Camden. If the Welsh, who have always called themselves *Cymry*, are the Cimbri of the antient Cimbric Chersonese, now Jutland, this lineage would account for the Scandinavian or northern origin assigned to the Picts by the uniform testimony of the Saxon, the Irish, and the Icelandic annalists.

The greatest diversity of opinion has also prevailed as to the extent of the territory occupied by the Picts in the north of Britain. Pinkerton, who considers the Picts to be the same people with the Caledonians, holds them to have occupied not only the Orkney Islands and the Hebrides, but the whole of Scotland to the north of the Frith of Forth and Clyde, and to have extended their conquests on the east coast as far south as to the Humber. There is every reason indeed to believe that they were at one time in possession of a considerable territory to the south of the Forth. Bede expressly states that in his time the English held possession of the Pictish province in which stood Aebbercurnig, now Abercorn, in West Lothian, the seat of one of their bishops. Here too was Peanfahel, now Kinneil; and Edinburgh, farther to the east, on the same side of the Forth, is also described by old writers as having been at one time within the dominion of the Picts. But, at least during the greater part of the time that it subsisted, the Pictish kingdom appears to have been bounded by the Frith of Forth to the south, and to the west by the mountainous range still separating the Lowlands from the Highlands of Scotland. The kingdom of Strath-Clyde, or Cumbria, however, or Reged (that is, the kingdom, by way of pre-eminence), as it was usually designated by the Welsh, which comprised the south-west of Scotland, and perhaps also the county of Cumberland (if that did not form a separate state), must be regarded as having also been Pictish on the hypothesis which assumes the Picts to have been the same people with the Welsh, the latter being admitted on all hands to be of the same race with the people of Strath-Clyde.

The history of the Pictish kingdom established in the north-east of Scotland is, as may be supposed, exceedingly scanty and obscure. The Scottish and Irish chronicles however supply five different lists of the Pictish kings, no one of which evidently has been copied from another, although they all agree substantially, with the exception of such variations as tend to establish the independent authority of each. From these lists Pinkerton has framed a Pictish chronology, which he divides into two portions: the first, which he entitles Poetical, extending from the foundation of the monarchy by Cruthen, or Cruidne (whence the Irish name for the Picts), about A.D. 28, through a succession of thirty-six kings, ending with Talorc I., A.D. 414; the second, styled Historical, extending from the accession of the successor of Talorc, Drust the Great, through forty princes more, to the subversion of the monarchy in A.D. 843, in the reign of Brudi VII. Besides the succession of the kings, a few events of Pictish history are also recorded by the Irish and Icelandic, as well as by the less antient Scottish chroniclers. These consist chiefly of the foundations of a few towns, and of battles fought with the Scots, or Irish colonists of the north-west of Scotland, with whom the Picts appear to have been almost constantly at war from the first establishment of these new settlers in the country about the beginning of the sixth century. Bede and Ailred state that the Southern Picts were converted to Christianity by St. Ninian about the year 412; but it may be doubted whether these were the Picts living between the Forth and the Grampians, as Bede affirms, or the people of Strath-Clyde, among whom it is known that Ninian was established as bishop of Whithern, now Whitehorn, in Wigtonshire. The conversion of the Northern Picts is attributed to St. Columba, about the year 565.

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[*] It is remarkable that in Angus, and the other counties on the north east coast of Scotland where the Picts were longest established, the popular speech is still characterised by the peculiarity of the substitution of the element *f* for *w*, or *wh*, or *gw*. Thus, for *what* the people of that district all say *fat*, just as their Pictish ancestors for Pengual said Penfahel or Penfal.

No passage of the obscure story of the Picts is involved in greater darkness than the sudden catastrophe which appears to have put an end to their dominion in their principal seat, the north-east of Scotland. The common account of the Scottish historians is, that the Pictish kingdom was conquered in the year 843 by the Dalriadic or Scottish king Kenneth II., who thus, for the first time, united the whole of North Britain into one monarchy. The oldest authorities for this account are the Chronicon Regum Pictorum, written apparently about the beginning of the eleventh century (it comes down to the year 992), and first published by Father Innes in 1729; and the Register of St. Andrews, written about 1130. On the other hand it is extraordinary that no allusion should be made to any revolution as having taken place in Pictland about this time, either by Nennius, who wrote about 858, and who expressly states that the Picts then continued to hold a third part of Britain; by Asser, the biographer of King Alfred, who wrote before the end of the same century, and who speaks of the Danes ravaging the Picts in 875; by the Saxon Chronicler, by Ethelwerd, or by Ingulphus, who, in the tenth and eleventh centuries, all continue to speak of the Picts as an existing people; by the Irish annalist Tighernac, who wrote about 1088, and who continues a regular chronicle of the Pictish kings, among whom he reckons Kenneth himself, down to the death of his son Constantine II., in 875; by the Welsh annalists, who, in like manner, style Kenneth simply king of the Picts; or finally, by the singular genealogical poem, commonly called the Gaelic or Albanic Duan, belonging to the reign of Malcolm III. (1056-1093), which indeed does not mention the Picts at all, but passes over the reign of Kenneth II. without any remark. It thus appears that neither the Irish, the Welsh, nor the Saxon annalists who lived nearest to the time, ever heard of this subjugation of the Picts by the Scots, which the later Scottish chroniclers would have us believe amounted to the entire destruction of the Pictish nation, and indeed to the utter extirpation of that people from the soil of Scotland. Nevertheless, the fact remains unquestionable and undisputed, that Kenneth II., or Kenneth Macalpin, as he is commonly called, having been originally king of the Scots, or Dalriads, became king of the Picts about the date assigned to his conquest of that people; and the probability therefore seems to be that this Dalriadic king had a claim by descent to the Pictish throne, and that the contest in which he proved victorious was in fact not a war between the Scots and Picts, but merely a dispute between him and a rival claimant for the crown of Pictland, which terminated in its acquisition by Kenneth, and consequently in the union of the two kingdoms under one sceptre. Kenneth, we may here notice, appears to have followed up this success by a course of policy having for its aim the ultimate incorporation with his own dominions of the adjoining (perhaps Pictish) kingdom of Strath-Clyde; and that object was in fact accomplished, and the whole of what is now called Scotland brought (nominally at least) under one rule, in the year 973, in the reign of his great-great-grandson Kenneth III. Even down to a considerably later date than this however, a great part of the north-east of Scotland appears to have been actually held by Norwegian princes, who did not acknowledge the sovereignty of the descendants of Kenneth Macalpin; and even some of the great Highland chiefs of the west long continued to maintain almost as substantial if not as openly avowed an independence.

Certain singular architectural remains found in some parts of Scotland are still popularly known there by the name of Picts' houses: and the Picts, or Pechs, live in the traditions of the country as a people of almost superhuman strength and dexterity. This would seem to indicate the possession by that race of a more advanced civilization than belonged to the other races by whom they were surrounded. Many carvings on stone, of a very remarkable character, the prevailing emblems being a serpent with a zigzag line passing through it, and two or sometimes three circles united by double parallel lines, are scattered over the whole of the tract which once formed the dominion of the Picts; but these curious monuments have not yet received the investigation they deserve, and whether they are Pictish or Norwegian remains doubtful.

(An account of all the principal works relating to the Picts and the other antient inhabitants of Scotland which had appeared down to the date of its first publication, is given in the Introduction to Pinkerton's *Enquiry into the History of Scotland preceding the reign of Malcolm III.*, 2 vols. 8vo., London, 1789, and 2nd edit., Edin., 1814. Among the works upon the same class of subjects that have since appeared, the following are the most important: 'Caledonia, or an Account, Historical and Topographic, of Great Britain,' by George Chalmers, Esq., 3 vols. 4to., London, 1807-1824; 'Rerum Hiberniarum Scriptores Veteres,' edidit C. O'Conor, D.D., 4 vols. 4to., Buckingham, 1814-1826; 'Memoirs of the Celts, or Gauls,' by Joseph Ritson, Esq., 8vo., London, 1827 (but written before 1803), in the appendix to which is a Bibliotheca Celtica, or catalogue of books on Celtic Antiquities, extending to above 200 titles; 'Annals of the Caledonians, Picts, and Scots, and of Strath-clyde, Cumberland, Galloway, and Murray,' by the same, 2 vols. 8vo., Edinburgh, 1828 (also written before 1803); Dr. Pritchard's 'Researches into the Physical History of Mankind,' 2 vols. 8vo., 1826, and 2nd edition, 1837, and his 'Eastern Origin of the Celtic Nations,' 8vo., 1831; 'Thoughts on the Origin and Descent of the Gael, with an Account of the Picts, Caledonians, and Scots,' by James Grant, Esq. of Corrimony, 8vo., London, 1828; Sir William Betham's 'Gael and Cymbri,' 8vo., Dublin, 1834; 'The History of Ireland,' by Thomas Moore, Esq., vol. 1, 12mo., London, 1835; 'Britannia after the Romans,' 4to., London, 1836; and 'The Highlanders of Scotland, their Origin, History, and Antiquities,' by W. F. Skene, 2 vols. 8vo., London, 1837.)

PICTURE. [PAINTING.]

PICTURESQUE (in Italian *Pittoresco*, painter-like or picture-like, and therefore expressed in German by the word *Mahlerisch*, which is of exactly the same import) is that quality which peculiarly recommends objects for pictorial representation. Consequently, in order to ascertain wherein this quality consists, it is necessary to consider what it is that independently of other things contributes to the general effect of a picture, and recommends more particularly certain classes of objects as suitable for the pencil. A picture is a representation upon a plane surface of bodies in relief, described as they appear to the eye, by means of form and colour, and their accompanying light and shade, which degree of relief or illusion will generally be in proportion as the objects themselves are favourable to artistical execution on account of the apparent diversity and variety which they present to the eye, and with which they must accordingly be represented in painting, although in themselves, or taken separately, they may appear monotonous. Hence, provided any object presents that variety to the eye which the artist requires in order to display the *artifice* of his pencil, it matters not how unpicturesque it may be when otherwise viewed, or though it should possess in itself none of those qualities which are commonly insisted upon as essential to the picturesque. 'The ideas of *neat* and *smooth*,' says Gilpin, who is generally referred to as an authority upon this subject, 'instead of being picturesque, *disqualify* the object in which they reside from any pretensions to picturesque beauty.' Yet such theory ought to be upset and disqualified in turn; for how can we reconcile it with fact when we observe that many things which are remarkable for the very *smoothness* here objected to as a disqualification, are selected by the artist as being admirably suited for his pencil? Smoothness is one quality of satin and velvet; and the idea of smoothness, it may be presumed, and generally of uniformity of colour also throughout the material, is excited in the beholder; but then, in order to produce such appearance in painting, the artist must employ a great number of tints and colours; some of them quite different from the local or positive colour of the object itself, in order faithfully to express all the various modifications which the actual colour of the object receives from light, when seen as it is intended to be represented in the picture. For instance, in painting white satin, there will be comparatively little pure white—only on the high lights—but chiefly the middle tints, half shadows, reflexes, and full shadows, so that if that part of the canvas were cut out, it would appear only a rough blotched surface, like the stains on a weather-beaten wall, than which it is no less picturesque, and for the same reason, namely, on account of the variety and irregularity it presents to the eye in the breaking of the colours: and it is this kind of variety, not roughness or rudeness or irregularity in the thing itself, that, as far as colour is concerned, qualifies objects for pictorial representation.

Another opinion, which appears equally incorrect, is that the picturesque is something distinct from and opposed to beauty, whereas this is very far from being the case; for although there is an extensive class of objects which are disagreeable, and some of them almost disgusting in reality, and which yet become attractive in representation, where they are divested of all that renders them physically repulsive (such as beggars, hovels that seem the abode of penury and filth, &c.), there are likewise numerous others which, while they are beautiful in themselves, are far from being deficient in picturesque quality. It is true there are also not a few that are eminently delightful or beautiful in nature, yet become insipid in representation; but that is because they are deficient in that variety of colour and form which painting demands. A level well-kept lawn presenting a uniform surface of rich verdure is beautiful, that is, excites lively pleasurable emotions, but it is so far from picturesque that it is generally made use of as an argument to prove that neatness and smoothness are incompatible with picturesqueness. Such an object undoubtedly, when transferred to the canvas, does not produce a good effect, inasmuch as it then shows only as a monotonous surface of nearly unbroken green colour: this however is only true when no diversity is produced by treating the subject *picturesquely*. If we break its uniformity of surface by figures, by shadows, by gleams of light, by gradations of hue, though it will still convey the idea of being a level piece of grass, it will be divested of its monotony, and may even become picturesque, if it should produce a good contrast to other parts.

The same theory holds true with respect to *form*, it being by no means correct that objects are picturesque in proportion as they are irregular and devoid of symmetry. To say therefore, as Gilpin has done, that if we introduce a piece of regular architecture into a picture without any of the disfigurements occasioned by accident or decay, 'it immediately becomes a formal object and ceases to please,' is either a very erroneous or a very imperfectly expressed idea. Most undoubtedly, if it be shown merely in elevation, a structure which is symmetrical will produce a formal appearance: but then there is no occasion for its being so exhibited; on the contrary, by means of judicious foreshortening or perspective, of shadows thrown upon it so as to break up the too great equality of its masses, and by means of figures and other accidents, it may be made to present an agreeable species of irregularity to the eye, at the same time that it suggests to the mind the idea of the most perfect symmetry. If for instance we view a colonnade in front or parallel to the picture, it will undoubtedly be formal and monotonous, but if it is shown obliquely and from a near station, so as to be considerably foreshortened, though we still perceive that it is precisely the same as before, the columns all equidistant and equal in height, the representation is produced by unequal spaces and unequal heights; the horizontal lines vanish obliquely, the farther parts are diminished, and many are partially concealed or indicated only by those which are shown; besides which the whole may be so broken by shadows falling upon the object, that the contrast of the masses of light and shade is alone sufficient to remove whatever monotony might else exist. Therefore, although the term picturesque is applied, by way of distinction, to that class of objects which are well suited for painting, but possess qualities more or less disagreeable in themselves, and so far implies something distinct from if not absolutely opposed to beauty, it comprehends also another class, which, while they are beautiful in themselves, are accommodated to pictorial representation, inasmuch as, in order to produce their images upon canvas, there must be great contrasts and irregularities both in respect to form and colour. Surfaces perfectly smooth and of uniform colour in themselves, such as those of highly polished marble or metal, must be expressed by a variety of colours, and by sudden lights and shadows perfect regularity of form, by a distorted image of the object according to the laws of perspective; while the uniform hue of local colouring is variously modified, according to the position and distance of the object, by aerial perspective, and by light and shadow and reflected light: and in proportion as they afford scope for displaying the effects of both linear and aerial perspective, and the contrasts and changes of form and colour arising from them, will objects partake of the picturesque.

PICUMNUS, M. Temminck's name for a genus of birds placed by Mr. Swainson in his subfamily *Buccoinæ*, or *Barbuts*, in the family Picidæ. The form has, according to Mr. Swainson, the habit of *Asthcnurus*, Sw.; but the rictus is bristled, and the tail very short, and not projecting beyond the wings.

Example, *Picumnus abnormis*.

Locality.—Tropical Asia.

PICUS. (Ornithology.) [Picidæ.]

PIEDMONT, PIEMO'NTE, or PIE' DI MO'NTE, which means a country at the foot of mountains, is the old name of a district of North Italy which forms part of the Sardinian States. Piedmont Proper is bounded on the east by Monferrato, west by the Cottian Alps, which separate it from Dauphiné, south by the former marquisate of Saluzzo, and north by the Val d'Aosta. [Aosta; Monferrato; Saluzzo.] It has the title of a principality, and the eldest son of the king of Sardinia is styled Prince of Piedmont. But Piedmont is no longer an administrative denomination, that tract of country being included in the division of Turin, which is subdivided into the provinces of Pignerol, Susa, Turin, Biella, and Ivrea, which are described under those heads in this work.

The name of Piedmont however was also and is still occasionally used as a general denomination for that part of the continental territories of the king of Sardinia which is situated on the Italian side of the Alps, and between the Alps and the Ligurian Apennines, as distinguished from the other great divisions of the monarchy, namely, the duchy of Savoy, the county of Nice, and the duchy of Genoa. In this larger sense Piedmont includes a fine and extensive tract of country 120 miles long from north to south, from the Pennine Alps to the Ligurian Apennines, and between 90 and 100 miles in breadth. It forms a distinct geographical region, having natural boundaries and a peculiar physical character. It comprises the western or highest part of the basin of the Po, from the sources of that river to where it emerges from the hills of Monferrato and enters the great plain of Lombardy, including its numerous and large affluents, the Tanaro, the Stura, the Bormida, the two Dora, &c. It is a country of hills and valleys, being occupied by numerous offsets of the Alps and of the Ligurian Apennines, except towards the eastern borders, where it merges into the plain of Lombardy, on the side of Vercelli and Mortara.

During the middle ages this fine country was parcelled out into several feudal principalities and lordships, under a nominal allegiance to the German emperors as kings of Italy, namely: 1, the principality of Piedmont Proper; 2, the duchy of Aosta; 3, the duchy of Monferrato; 4, the marquisate of Saluzzo; 5, the county of Asti; 6, the marquisate of Ceva; 7, the lordship of Vercelli. In course of time the dukes of Savoy became possessed of all these districts, either by conquest or inheritance, the houses of the former lords having become gradually extinct. The possession of these provinces by the House of Savoy was acknowledged by treaties and by diplomas from the German emperors. (Agostino della Chiesa, *Corona Reale di Sa-*

voia.) In the last century the House of Savoy became possessed also of the extensive district called Novarese, which was formerly part of the duchy of Milan. [NOVARA.]

The country of Piedmont, generally speaking, is one of the most fertile, healthy, and pleasant in Italy. It produces corn, rice, Indian corn, wine, fruits in abundance, timber-trees, excellent pasture for cattle, hemp, and silk. Oil is not a produce of Piedmont. The system of irrigation has been long practised in Piedmont, and it is carried to considerable perfection wherever the slope of the ground and the vicinity of running water afford the opportunity.

The population of all Piedmont amounts to nearly two millions and a half, being about three-fifths of that of the whole monarchy, the island of Sardinia included. In no part of Italy is there so great a proportion of considerable towns containing from 3000 to 10,000 inhabitants. For further statistical details, see SARDINIAN STATES.

The inhabitants of the various districts included under the general name of Piedmont, although possessing shades of character, have many common traits of resemblance which characterise them as a nation distinct from their neighbours of Savoy, Genoa, and Lombardy. They all call themselves Piedmontese, and at times also Subalpini. They are generally a well-made race of men, spirited, warm-hearted, brave and highly susceptible of milit[illegible] discipline, and have long enjoyed the reputation of [illegible] the best soldiers in Italy. They are also loyal, frank, attached to their country and their sovereign, though by no means servilely disposed; they are religious, and the lower orders even superstitious. The country population is much under the influence of the clergy. The nobility, who are very numerous, consist chiefly of landed proprietors with a moderate rental, most of whom live in their respective provinces. The Piedmontese are susceptible and hasty; they are fond of conviviality, and are less distinguished for sobriety than the rest of the Italians, but they are also industrious and hospitable. Less poetical than the other Italian nations, they are more disposed to the positive and practical sciences, as well as to the mechanical arts. Piedmont has produced many men of science, mathematicians, engineers, good generals, natural philosophers, historians, classical scholars, and philologists. In our own times, Alfieri, Denina, Botta the best historian of modern Italy, the poet Silvio Pellico, the orientalist Peyron, the mathematician and astronomer Plana, and several others, deserve mention.

The Piedmontese dialect, which is the spoken language of the whole country, with some shades of difference in the various districts, is one of the most remote from the written Italian. It is in a great measure an offspring of the Romance language which prevailed in Southern Europe during the dark ages, and has considerable affinity to the Languedocien and other dialects of the south of France. The pronunciation is a mixture of French and Italian; it has the French sounds of the *u* and the *eu*, which Alfieri disliked so much; but at the same time the Piedmontese retain the Italian sound of the *c* and of the *j*, and when they speak French they find a difficulty in pronouncing the *ch* and the French *j*. The Piedmontese is also a written dialect, and is well adapted for poetry. Calvo and others have written poems in it, and Brofferio has lately published a volume of Canzoni (*Poesie Piemontesi del Medico Edoardo Calvo*, Torino, 1816; *Canzoni Piemontesi di Angelo Brofferio*, Lugano, 1839). A Piedmontese vocabulary, by Zalli di Chieri, was published at Carmagnola, 3 vols. 8vo., in 1815; and a more compendious one has been published by Michele Ponza, Torino, 1827.

PIEPOWDER COURT. [PIPOWDER COURT.]

PIER (from the French *pierre*, stone) the general name for the solid spaces between a series of openings in a wall, whether windows or arches; but in its technical meaning the term is more particularly applied to the pillar-like masses of masonry or brick-work from which arches spring, rising from what is termed the *impost* capping the pier, and which generally consists of a series of mouldings, although sometimes it is merely a platband, and occasionally the impost is omitted altogether, especially in rusticated basements. For the relative proportion between the breadth of the piers and the width of the arches, no rules either can or need be laid down, because it must be more or less regulated by circumstances, and we accordingly find very great differences in this respect in examples of equal authority, and consequently far greater diversity of architectural character is thus attainable than if any one fixed standard were constantly adhered to. Besides which, the bulk or breadth and thickness of piers must depend in a great measure upon the solidity required for the building and the weight they have to support. Still, as far as architectural beauty is concerned, the breadth of the piers should never be much less than one-third of that of the arches (supposing the latter to be open ones), otherwise the effect will be meagre and deficient in solidity of appearance; and in architecture excess of solidity even approaching to heaviness is generally a lesser defect than the contrary one. Much also depends not merely upon the width, but the proportions of the arches themselves, for if very wide, or less than twice their width in height, greater breadth is required in the piers than when the openings between them are of lofty or narrow proportion. In the external arcade or piazza [PIAZZA] of the old Royal Exchange, London, the piers were exceedingly narrow or slender compared with the arches, so much so as to be little more than square pillars or insulated pilasters with arches springing from them. It would be better therefore in similar cases to treat them altogether as such, converting their imposts into pilaster or antæ caps, as is occasionally done; for instance, in the arcade or loggia of the Southampton Railway Terminus at Vauxhall, where, but for such expedient, the piers would look offensively meagre.

Piers are frequently decorated with either pilasters or engaged columns, in which case their breadth must be such that the archivolt mouldings of the arches will fill up the space between the openings and the columns. In many instances columns are substituted for piers, placed either singly or in pairs; and the arches spring either immediately from their capitals or from an entablature over them. There are again many examples in which both piers and a lesser order or sub-order of columns are employed, the latter being insulated on each side of the pier, and their entablature forming the impost from which the arches spring. Palladio's Basilica, or Palazzo di Ragione, at Vicenza, affords an example of the kind, in which the faces of the piers themselves consist of a larger order in half columns, so that the whole composition resembles a series of what are termed arched Venetian windows entirely filling up the spaces between the larger columns. Besides these and other modes of decoration, niches are occasionally introduced as ornaments to piers.

In Gothic architecture (where open arches seldom occur except singly, in the exterior of buildings, as in gateways and porches), the insulated piers supporting what are distinguished by the name of pier-arches are not rectangular in plan, but splayed off or turned diagonally; and their splayed sides are broken into small attached pillars, or else moulded shafts, which latter are sometimes a continuation of the mouldings forming the arch, carried down without any interruption by capitals or horizontal mouldings to the shafts, yet sometimes terminating below in moulded bases; at others *dying into* or uniting with the plain surface forming the footing or general base of the pier.

The term pier is also applied to the solid masses supporting the arches of a bridge; with the exception of the extreme ones, which are distinguished by the name of abutments. [ABUTMENTS.] The piers of bridges have no impost mouldings, and they are carried quite through the structure, their depth being equal to the breadth of the bridge itself from the parapet on one side to that on the other.

Pier is likewise the name given to a mole or jetty carried out into the sea, whether intended to serve as an embankment to protect vessels from the open sea, or merely as a landing-place; for which latter purpose suspension chain-piers are now frequently employed.

PIE'RIA. [MACEDONIA.]

PIERRE, BERNARDIN DE ST., born in 1737, after studying at Paris, entered the department of civil engineers under the government, or 'ponts et chaussées,' as it is styled in France. A reduction however, which took place some time after, left him unemployed, and he entered the army as military engineer; but having quarrelled with his superior, he was dismissed from the service. He went to Malta with the promise of a commission, but found himself disappointed. He next visited Russia, where he found some friends who obtained for him a situation as engineer in the Russian service, in which he remained some time, and executed several surveys. He had drawn up the project of a colony of foreigners, to be established on the eastern bank of the Caspian Sea, with a republican government, under the protection of Russia. He presented his plan to the favourite Orloff, who told him coldly that such plans could not suit the policy of Russia. Becoming weary of that country, he went to Poland, with the intention of fighting against the Russians, but a love intrigue which he had at Warsaw detained him there for about a year without doing anything. From Poland he went to Dresden and Berlin, and at last returned to France, when the Baron de Breteuil procured him a commission as engineer in the Isle of France, or Mauritius, on the understanding that he was to proceed to the island of Madagascar to endeavour to realise there his favourite plan of a republican colony. While on the voyage he found out that his companions, instead of being intent on establishing liberty on the Madagascar coast, were proceeding thither for the purpose of procuring a supply of slaves. He quarrelled with them, and having landed in the Isle of France, he lived two years there, after which he returned to Paris, where he became acquainted with D'Alembert, Mademoiselle d'Espinasse, and other literary characters, who encouraged him to publish a narrative of his voyage. From that time his career as a literary man began. He afterwards wrote his pretty story of 'Paul and Virginia,' one of the best works of its kind in the French language, and which has established his rank among French writers. His other works are—1, 'Etudes de la Nature;' 2, 'La Chaumière Indienne;' 3, Harmonies de la Nature;' 4, 'A Narrative of his Journey to Russia;' 5, 'Essais sur J. J. Rousseau,' besides several plays. He had a situation under the government, when the Revolution broke out and again reduced him to poverty. The principles of the Revolution were however in accordance with his own theories of government, but when the reign of terror came he was in some danger, especially as he ventured publicly to profess his belief in God, which, in 1794, was considered by some of the ruling men as a ground of suspicion. At last he found a protector in Joseph Bonaparte, brother of the victorious general of the army of Italy, who generously assigned him a pension. Napoleon himself showed him kindness; he gave him the cross of the Legion of Honour, with a pension, and placed his son in a lyceum and his daughter in the Imperial school of Ecouen.

Bernardin de St. Pierre died in 1814. He was a kind of visionary for the greater part of his life, and his writings bear the stamp of his character. His works have been collected and published in two volumes, 4to., with his biography: 'Oeuvres de J. H. Bernardin de St. Pierre, mises en ordre par L. Aimé Martin,' Paris, 1836.

Bernardin de St. Pierre must not be confounded with Charles Abbé de St. Pierre, a philanthropist of the early part of the eighteenth century, known for his project of a perpetual peace, which he laid before the diplomatists assembled at Utrecht: 'Projet de Paix Perpetuelle,' Utrecht, 1713; also a 'Projet pour perfectionner l'Education,' and numerous other works, which Cardinal Dubois used to call the dreams of an honest man, but some of which however have been since acknowledged to be susceptible of being realised.

PIETISTS, the name given in the seventeenth century to a kind of German Methodists or Evangelicals, who, being members of the Lutheran Church, were dissatisfied with the cold dogmatism of the generality of its clergy, and felt the want of a revival of religious feeling and of practical piety and charity. Without separating themselves from the church, they instituted meetings called 'Collegia Pietatis,' from which the denomination of Pietists was derived. Philip Jacob Spener, a divine of the Lutheran Church, who was preacher at Frankfort and afterwards at Dresden and Berlin, was the chief promoter of these meetings, which began about 1670. He wrote several ascetic works, and died in 1705. [METHODISM.] A spirit similar to that of the Pietists of Germany has arisen in our own times in the Swiss and French Protestant churches, and the promoters of it, after suffering considerable annoyance from the less religious part of the community, have succeeded in effecting a revival of evangelical doctrines and practice. They have been styled in derision 'Momiers' (from *momerie*, mummery), a name which the great majority of them are far from deserving.

PIETRA MALA. [TUSCANY.]

PIGAFE'TTA, ANTONIO, born at Vicenza in the latter part of the fifteenth century, of a patrician family, applied himself to the study of mathematics and geography. Being highly interested in the discoveries which were then being made by Spanish and Portuguese expeditions, he set out for Spain in the suite of the papal nuncio to that country. Finding that an expedition was going to set out from Seville under the direction of Magalhaens, he asked and obtained of the emperor Charles V. permission to join it as a volunteer. The expedition sailed from S. Lucar in September, 1519. [MAGALHAENS.] Pigafetta, being a volunteer on board, and having no obligatory duties to perform, wrote day by day a journal of the voyage. Being gifted with a robust frame and healthy constitution, he bore the hardships and escaped the diseases which destroyed most of the crew. He was present at the landing on the Philippine Islands, where Magalhaens lost his life, and was wounded in the affray. He returned to Spain in the admiral ship Victoria, the only one that remained out of the five which had sailed together. He landed at Seville in September, 1522, having performed in the course of three years the first voyage round the globe. After repairing to church with his travelling companions in solemn procession and barefooted to thank God for their safe return, Pigafetta went to Valladolid, where he presented a copy of his journal to Charles V.

Pigafetta afterwards returned to Italy, and, at the request of Pope Clement VII., he wrote a more elaborate narrative of his voyage, with a description of the strange coun[illegible] he had visited, and short vocabularies of the languag[illegible] the Philippine and Molucca Islands. This narrative he dedicated to the grand-master of Rhodes, L'Isle Adam, and he sent a MS. copy to the Princess Louisa of Savoy, from which a French abridgment was made by a certain Fabre, and published at Paris without date. Of this abridgment, Ramusio inserted an Italian translation in the first volume of his 'Raccolta di Navigazioni e Viaggi,' fol., Venice, 1550. At last Amoretti discovered in the Ambrosian Library at Milan a complete copy of Pigafetta's original narrative, which he published, 'Primo Viaggio intorno al Globo,' 4to., Milan, 1800, with plates, drawn from the maps and sketches which accompanied the MS. Pigafetta's was the first account that Europeans had of the islands in the Pacific Ocean. Of Pigafetta's personal history after his return to Italy nothing is known, except that he was made a knight of the order of St. John. His house was still seen lately in his native town of Vicenza.

PIGEON PEA is the seed of the plant called, by Linnæus, Cytisus Cajan, and by De Candolle, Cajanus bicolor and flavus. It is a kind of pulse highly esteemed by all classes of the natives of India, and is by them regarded as holding the third rank among such articles of food. Cattle are said to be fond of the tender parts of the plant, whether green or dry. These two species, or varieties, form bushes resembling shrubs, but, according to Roxburgh, they seldom live more than two or three years, even if treated with the greatest care. The natives consider them annual, because they do not bear well the second year, and after collecting the first crop they pull the plants up for firewood. Cajanus bicolor grows from six to eight feet high, ripening its seeds in about nine months from the time they are sown, and producing about 600 fold; the other is much smaller, and yields in three months, but not more than 100 fold. The Telinga name of the first is Pedda Candi, and of the grain Pedda Kandiloo. (Roxb., *Fl. Ind.*, iii. 325.)

PIGEONS. [COLUMBIDÆ.]

PI'GHIUS, STE'PHANUS VINAND, born in 1520, at Kempen in the province of Overyssel, in the Netherlands, was nephew, on his mother's side, of Albert Pighius, a learned controversialist of the sixteenth century, who lived at Rome, and wrote against the Lutherans. Stephen Vinand, after studying in his native country and at Cologne, entered the ecclesiastical profession, and repaired to Rome, where he was well received on account of his uncle's reputation (his uncle being then dead), in honour of whom he added the name of Pighius to his paternal name of Vinand. He spent 8 years at Rome in studying antiquities, examining monuments, and copying inscriptions, &c. This labour was preparatory to the great work which he afterwards wrote on the Roman annals. On his return to the Netherlands he was made librarian to Cardinal Granvelle, after whose death he was appointed by the duke of Cleves preceptor to his son, with whom he travelled through Italy about 1575. The young man however died at Rome, and Pighius returned to his native country, and retired to the town of Xanten, of which he was a canon. He died in 1604, after publishing the first volume of his great work 'Annales Romanorum,' leaving the MS. of the remainder to the Jesuit Andreas Schott, who published the two following volumes. The full title of the work is 'Annales Magistratuum et Provinciarum S.P.Q.R. ab Urbe Condita, ex Auctorum Antiquitatumque variis Monumentis suppleti; in queis Reipublicæ Mutatiônes, Potestatum ac Imperiorum Successiones, Acta, Leges, Bella, Clades, Victoriæ, Manubiæ atque Triumphi, necnon inlustria Stemmata Familiarumque Propagines ad Annos et Tempora sua reducuntur,' 3 vols. folio, Antwerp, 1615. Pighius gives a chronicle of Rome year after year, from the building of the city, to the death of Vitellius, A.D. 69, the names of the consuls, tribunes, censors, ædiles, quæstors, prætors, proconsuls, proprætors, and other governors of the provinces, wherever their names can be ascertained from antient writers or monuments. He also notices briefly the principal events of each year, carefully quoting his authorities. Wherever an inscription bears upon a fact, he transcribes it. He also mentions the titles of the principal laws and senatus consultus, under their respective years. It is altogether a work of vast research and erudition, which cost the author more than twenty years' labour. His chronology has been found faulty, as most Roman chronologies are. (See Fortia d'Urban, in the French edition of Tacitus, by Dureau de Lamalle.) Pighius also published a good edition of Valerius Maximus, with valuable notes, Antwerp, 1585.

PIGMENTUM NIGRUM. [EYE.]

PIGNERO'L, or PINERO'LO, a province of the Sardinian states, bounded on the east by the province of Turin, on the south by that of Saluzzo, on the north by the province of Susa, and on the west by Mount Genèvre, which divides it from France. It is a mountainous region, being covered by offsets of the Alps, which form several valleys, through which flow the Chisone and other affluents of the Po. A road which crosses Mount Genèvre leads from Briançon in France to the town of Pignerol. A part of this province is occupied by the district of the Valdenses, consisting of three or four elevated valleys at the foot of Mount Genèvre. [VALDENSES.] The population of the province of Pignerol is estimated at 111,600 inhabitants, distributed among sixty-nine communes. (Serristori's *Statistica d'Italia*, 1835.) The principal towns are the following: 1, Pignerol, once considered a strong place, and still a garrison town, is a bishop's see; it has several churches and convents, a handsome cathedral, a large hospital, several manufactories of silk, woollens, and leather, and about 11,500 inhabitants. 2, Villafranca di Piemonte, situated in a fertile country near the confluence of the Chisone with the Po, contains 7600 inhabitants. 3, Cavour, with 6400 inhabitants. 4, Fenestrelle, in the valley of Pratgelat, at the foot of the high Alps, is a small town with about 800 inhabitants: it is only remarkable for its fortress situated on a bleak mountain, which was one of Napoleon's state prisons, and of which a full account is given by Cardinal Pacca, in his 'Memorie Storiche,' 2 vols., 1830. The cardinal was confined in the fort, together with numerous other state prisoners of various conditions, from August, 1809, to January, 1813, for his fidelity to Pope Pius VII. 5, Cumiana has 5000 inhabitants.

The province of Pignerol produces good wine, silk, and some corn; it also abounds in cattle. Chestnuts are plentiful in the mountains. The chamois, the wolf, and bear are found in the high Alps. (Neigebaur; *Calendario Sardo.*)

PIGNOTTI, LORENZO, born in 1739, at Figline in the Val d'Arno, studied medicine at Pisa, where he took his degree of doctor of medicine. After practising for some time at Florence, he was made professor of natural philosophy at Pisa, where he spent the greater part of his life, and died in 1812. His principal work is the history of Tuscany: 'Storia della Toscana sino al Principato, con diversi Saggi sulle Scienze, Lettere, ed Arti,' 9 vols. 8vo., which was published after his death. He begins his history with the antient Etruscans, and continues it through the long period of Roman dominion. He describes the vicissitudes of the Tuscan cities after the fall of the Western Empire, the glorious period of the independence of Florence, Pisa, and Siena, and concludes his work with the fall of the Florentine republic and the assumption of supreme power by the second house of Medici. Galluzzi has written the latter part of the history of Tuscany: 'Istoria del Gran Ducato di Toscana sotto il governo della Casa Medici,' 5 vols. 4to., Florence, 1787. Pignotti came late for his historical subject, after numerous and able writers who had treated the same matter either wholly or in part, and the historical portion of his work may be considered rather a compilation than an original composition, yet he contributed to it something new by means of his own researches into the archives and libraries. But the essays which he has added in distinct chapters appended to the political narrative, on the Italian language, on the art of war in the middle ages, on the revival of sciences, letters, and the arts, and on the commerce of the Tuscans, are all entirely his own. His sentiments are liberal in the genuine sense of the word; he is no party man; he always avoided controversial politics, and maintained his own independence of opinion. It is reported that the poet and improvisatore Gianni one day observed to Pignotti with a sneer, that the university of Pisa reckoned several asinine doctors among its members. 'That may be,' retorted Pignotti, 'we have heard of Caligula making his horse a senator.' The repartee consists in this: Napoleon had just made Gianni a senator of the kingdom of Italy, and the enemies of Napoleon used to nickname him Caligula, on account of some fancied resemblance between him and the medals of that emperor.

Pignotti wrote also a series of fables or apologues in Italian verse, which have been often reprinted. Pignotti is acknowledged to be one of the best Italian fabulists. He also wrote some odes and other poetical compositions: 'Poesie di Lorenzo Pignotti,' Florence, 1820.

Pignotti was buried in the Campo Santo of Pisa, where a monument has been raised to his memory.

(*Elogio di Lorenzo Pignotti*, by Antonio Benci, in the Florence *Antologia*, 1821.)

PIKE, the English name for a fish belonging to the order Malacopterygii, section Abdominales, family Esocidæ, and genus Esox. The pike tribe were regarded by Linnæus as forming a genus, but in modern works on ichthyology they constitute a family. They have no adipose fin, as in the Salmonidæ, and are distinguished by the upper jaw being formed chiefly by the intermaxillary bones: the maxillary are destitute of teeth, and concealed by the lips; the dorsal and anal fins are almost always opposite each other, and their intestine is short and without cæca. To this family belong the genera *Esox* (or pikes proper), *Galaxias*, *Alepocephalus*, *Microstoma*, *Stomias*, *Chauliodus*, *Salanx*, *Belone*, *Scomberesox*, *Hemiramphus*, *Exocetus*, and *Mormyrus*.

In the genus Esox the snout is broad and depressed; the intermaxillaries form about two-thirds of the upper jaw, and are furnished with small pointed teeth, as well as the lower jaw, the vomer, palatines, tongue, pharyngeans, and branchial arches; there is one dorsal fin, and that is placed opposite the anal fin. The *Esox Lucius*, or common pike, is found in the fresh waters of most parts of Europe, and Cuvier moreover states that it also occurs in North America, where however two other species are met with. Mr. Jenyns states that the common pike is probably indigenous, though usually supposed to have been introduced into England during the reign of Henry VIII. It spawns in March and April, and occasionally attains a weight of thirty, forty, or even sixty pounds. The pike is one of the most voracious of fishes, and, it is said, will even eat those of its own species.

The genus *Galaxias*, founded by Cuvier on the *Esox alepidotus* of Forster, and *Esox truttaceus*, Cuvier, differs chiefly from *Esox* in having nearly the whole edge of the upper jaw formed of the intermaxillaries; the body is apparently destitute of scales, the mouth slightly cleft; moderate and pointed teeth are observable in both of the jaws and also in the palatines, and there are a few strong hooked teeth on the tongue.

The genus *Alepocephalus*, founded upon a fish found in the Mediterranean, differs from the last genera in having the body covered with broad scales; the mouth is small, and the teeth minute and crowded; the eyes large, and the branchial rays eight in number.

Alepocephalus rostratus of Risso is caught at great depths in the sea before mentioned.

Microstoma is also founded upon one species, and that an inhabitant of the Mediterranean. It is the *Serpe microstome* of Risso; has a very short snout; the lower jaw projects beyond the upper one, and is furnished, as well as the small intermaxillaries, with very minute teeth; it has three large and flat branchiostegous rays; the eye is large, and the lateral line is furnished with a series of strong scales; there is but one dorsal fin, and that is placed a little behind the ventrals.

The genus *Stomias* contains two species, both of which are found in the Mediterranean, and are remarkable for their black colour with series of silvery spots; they have the muzzle very short, the mouth very deeply cleft, the opercula reduced to little membranous laminæ, and the maxillaries fixed to the cheek; the maxillaries, intermaxillaries, palatine bones, and tongue are all furnished with long and curved teeth; the body is elongated, and the ventrals are placed far back.

Chauliodus differs chiefly from *Stomias* in having two teeth in each jaw, each pair crossing with the opposite when the mouth is shut; the dorsal fin (which has the first ray elongated into a filament) is placed opposite the space which intervenes between the pectorals and ventrals.

Only one species of this genus is known; it is fifteen or eighteen inches in length, and of a deep green colour. This species, which is the *Chauliodus Sloani* of Schneider, is found at Gibraltar.

The species of the genus *Salanx* (Cuv.) are distinguished by their depressed head, the opercula folding beneath; four branchiostegous rays; the jaws short and pointed, and furnished with hooked teeth; the lower jaw somewhat elongated at the symphysis, and bearing a small appendage which is furnished with teeth—no teeth either on the palate or tongue.

Belone.—This genus is established by Cuvier upon the *Esox Belone* (Garfish) of Linnæus, and some other species differing from the true pikes in having the jaws much elongated and slender; the entire margin of the upper jaw is formed of the intermaxillaries; both jaws are furnished with small teeth, but there are no teeth in the other parts of the mouth; those of the pharynx are like paving-stones; the body is much elongated, and furnished with scales, which however are indistinct except on the lateral line. [GAR-FISH.]

Scomberesox.—In this genus (which is instituted by Lacépède), as in *Belone*, the body is elongated and the snout very long and attenuated, but the species may be distinguished by the dorsal and anal fins being divided, and forming as it were a series of small fins situated on the upper and under side of the body near the tail. The Saury Pike, or Skipper (Scomberesox Saurus, of Flemming), belongs to this genus.

The species of the next genus (*Hemiramphus* of Cuvier) have the body elongated and slender, the lower jaw slender and much elongated, as in *Belone*, but the upper jaw is remarkably short; both upper and lower jaws, so far as they are opposeable, are furnished with small teeth. One species of this curious genus has been found on the British coasts, and is described by Mr. Yarrell in the 'Magazine of Natural History,' for October, 1837; a figure and description is also given by the same author in the 'Supplement to the History of British Fishes.'

Genus *Exocetus*, Linn.—The species of this genus are at once distinguished from other *abdominales* by the enormous developement of their pectoral fins, which are formed like wings, and enable these fishes to support themselves for a short time in the air, a circumstance which has given rise to the name of flying-fishes. Their head and body are covered with tolerably large scales, and a longitudinal ridge, formed by carinated scales, is observable on each side of the belly; the head is flat above, and the muzzle is very short and obtuse. [FLYING-FISH.]

Mormyrus, Linn.—The fishes of this genus have the body oblong, compressed, and covered with scales; the head is covered by a thick skin which envelopes the opercula and branchial rays, leaving no opening in the latter but a mere vertical fissure; the opening of the mouth is small; slender teeth emarginated at the end, are observable on the intermaxillaries and lower jaw.

These fishes inhabit fresh water, and several species are found in the Nile and some other rivers of Africa.

PILASTER. [COLUMN.]

PILATE, PONTIUS, is chiefly known by the part which he occupies in the New Testament history. Nothing is recorded of his extraction. Some of the early Christian writers have dwelt upon the etymology of his names, and have supposed them descriptive of his character, but, as Bishop Pearson says, 'in vain.' They appear to be simply the nomen and cognomen of the Romans, as Pontius Aquila, Pontius Herennius, and Julius Cæsar. Pilate was a man of the equestrian order, and he was appointed governor of Judæa by Tiberius, A.D. 26. By the variety of terms used to designate Pilate in this office, it seems difficult to understand precisely the nature of his governorship. Tacitus calls him procurator; Philo Judæus and the Greek fathers *ἐπίτροπος*. In the Greek Testament he is called *ἡγεμὼν*, and in Josephus both *ἐπίτροπος* and *ἡγεμὼν*. In the Vulgate he is named praeses, which Wiclif, translating from that version, renders 'the justice.' Tyndale translates the Greek *ἡγεμὼν*, *the debite.* In King James's translation he is called governor, and so also in the Rhemish translation. Dr Campbell calls him procurator, and probably this is the best word to point out the office of Pilate, though it is evident that the power of life and death, which he had over the Jews, exceeded that which procurators usually possessed.

The character of Pontius Pilate is sufficiently developed in the New Testament. Philo Judæus and Josephus represent him in a similar light, as a self-willed, avaricious, and hard-hearted man. Josephus states moreover that the Samaritans, having been treated by Pilate with great barbarity, made a complaint to Vitellius, governor of Syria, who ordered him to Rome, to give an account of his conduct to the emperor. This was after he had been procurator of Judæa ten years. Before he arrived at Rome, Tiberius was dead; but Eusebius and others relate that Pilate was banished to Vienne in Gaul, and that, unable to endure his disgrace, he killed himself with his own hand, about the year 38.

(Philo Judæus, *De Legat. ad Caium;* Josephus, *Antiq.* and *De Bello Jud.*; Eusebius, *Hist.*, b. i., c. 7, with the note of Valesius; Pearson, *On the Creed.*)

PILÂTRE DE ROZIER. [BALLOON.]

PILCHARD. [CLUPEIDÆ.]

PILCHARD FISHERY. [FISHERIES.]

PILCOMAYO. [PLATA, LA, River.]

PILE'OLUS. [TROCHOIDEA.]

PILEO'PSIS, Lamarck's name for a genus of mollusks (*Capulus* of De Montfort, which name has the priority whose place in the system was long doubtful.

The form was arranged by Linnæus under his genus *Patella*, with the name of *Patella Ungarica.*

Lamarck divided his genus *Pileopsis* into two sections the first consisting of those species whose shell was without any known support (*Pileopsis*, Lam., *Capulus*, Montf.); the second consisting of those species whose shell had a known support (*Hipponyx*, Defrance).

Mr. G. B. Sowerby, when treating of *Hipponyx* (*Genera*, No. i.), differs from Defrance, who first proved that the shell consisted of two parts, but still considered it as a univalve which had the property of making a support for the purpose of raising itself above the shells or stones to which it is attached. Mr. Sowerby states (*loc. cit.*) that he sees nothing in the nature of *Hipponyx* different from other bivalves; on the contrary, the numerous observations which he had made appeared to him only to strengthen the evidence in favour of a relation between this genus and the genera *Orbicula*, *Crania*, and *Terebratula;* and he adds, that he suspects that the animal has, in common with those genera, two fringed arms or tentacula. The same author, in his description of *Capulus* (*Pileopsis*, Lam.), (*Genera*, No. xxxviii.), observes that this genus may be regarded as a remarkable instance of the importance of a correct knowledge of the animal which forms it, as well as of the characters of the shell itself. He states that he had long entertained the opinion that the animal must be a gastropod, and consequently very different from that of Defrance's *Hipponyx*, which, in his opinion, is a truly bivalve shell. 'It may here be observed,' continues Mr. Sowerby, 'that in the bivalve mollusca the mantle envelopes the animal and lines the inside of the shell, depositing testaceous matter on its whole internal surface; the *Hipponyx* is therefore a true bivalve, for its animal must be wholly enveloped in its mantle, or testaceous matter could not be deposited on all sides; but in the present genus, which has been very erroneously united to *Hipponyx* by Defrance and Lamarck (on account, no doubt, of their general resemblance in form), there is a distinct head, with tentacula and eyes, and the branchiæ are arranged in a single row behind the head: there is moreover a small nearly circular foot, by which it is usually found adhering to oysters and other shells, stones, &c.; all which circumstances prove that it cannot produce a second valve, and that it is not therefore even related to *Hipponyx*. The shell itself also differs from the upper valve of *Hipponyx*, for in *Capulus* it is obliquely conical and curved backwards, uncinate, and somewhat spiral; in *Hipponyx* however, though it is obliquely conical, it is not recurved, nor is it in the least spiral. We are fully aware that in full-grown specimens of some of the *Capuli* the beak is not recurved; but we observe that in the young shells of the same species it is distinctly so. It is somewhat singular that, although the *Capuli* are gasteropods, they do not appear to remove from the spot to which they were at first attached, but, like several of the *Patellæ*, they seem to form, probably by a chemical action,* a more or less deep cavity in the surface to which they adhere; this circumstance alone should, as we think, be sufficient to distinguish the *Capuli* from the *Hipponyces*, for it is evident that an animal with a mantle capable of depositing testaceous matter cannot at the same time erode the spot to which it is affixing such calcareous deposit. But there is a circumstance in the peculiar form of the impression made by the foot of the *Capulus*, which, it appears, is difficult to understand; for the margin of this impression is sometimes more or less raised in a somewhat horse-shoe form, apparently corresponding to the muscular impressions in the lower valve of *Hipponyx*. We think this peculiar form may be caused by the contraction and expansion of the nearly circular foot in raising and depressing the shell, in order to permit the entry and egress of the sea-water.' There is much in this worthy of consideration; and we should remember that the author was not aware of the discoveries of the French voyagers, which have led to such a different conclusion, and, in short, to a confirmation of the original views of Defrance and Lamarck as to the relative place of *Pileopsis* and *Hipponyx* in the system.

M. Deshayes, in the last edition of the *Animaux sans Vertèbres*, remarks, that in treating of the *Pteropoda*, he had pointed out the error of Lamarck in considering them as intermediate between the *Acephalous Mollusks* and the *Mollusks properly so called*. M. Deshayes thinks, in accordance with the opinion of M. de Blainville, that if there exists a passage between these two classes of *Mollusca*, it is to be looked for in the genera *Pileopsis* and *Hipponyx*. The greater proportion of students in conchology, he observes, who for the first time compare the genera *Crania* [BRACHIOPODA, vol. v., p. 314] and *Hipponyx*, find a great relationship between them, and have a tendency to approximate them in arrangement. But the relations which exist between the shells not being continued in the animals which inhabit them, it becomes necessary for them to abandon this supposed approximation, on the ground that one of the genera (*Crania*) belongs incontestably to the *Brachiopoda*, whilst the *Hipponyces* are true acephalous mollusks. When the organization of the *Hipponyces* is compared with that of the *Acephala*, the observer finds with surprise that the strongest relations exist in reality between these two classes of animals.

The short description, continues M. Deshayes, given by Cuvier, in the *Annales du Muséum*, of *Pileopsis*, is the only one known at present; and this description teaches us that the animal, attached to its shell by a muscle in the shape of a horse-shoe, is provided with a foot comparable with that of the *Patellæ*; that it has a rather large cervical cavity containing a pectinated branchia comparable with that of the *Crepidulæ*; and finally, that it has a proboscidiform head, with two tentacles with eyes at their base. Observation has long demonstrated that the true *Pileopsides*, though they live after the manner of the *Patellæ*, are still more sedentary than the latter; for there may be seen, in certain individuals of the *Pileopsis Ungarica*, irregularities proceeding from the body on which it has lived when young continuing exactly the same to adult age—irregularities whose traces may be observed on the lines of growth, and which prove, in the opinion of M. Deshayes, that during its whole life the animal has never changed its place. This mode of existence approaches closely to that of *Hipponyx*. The latter genus, established by Defrance, was considered by Lamarck to be merely a section of the *Pileopsides*. Other zoologists, M. de Blainville among them, resting on new facts, adopted the genus of Defrance, and placed it in the neighbourhood of *Pileopsis*. M. Deshayes however thinks that it will nevertheless be possible, after a close examination of the two genera, to return to the opinion of Lamarck, and thus supports it.

The *Hipponyces* have a shell resembling that of the *Pileopsides*, but their delicate foot assumes the properties of the mantle, and becomes a secreting organ, producing a more or less thick calcareous support, on which the animal is attached by the same horse-shoe-shaped muscle which is inserted in the shell. The animal of *Hipponyx* then remains necessarily attached, after the manner of the *Oysters* and *Craniæ*, to submarine bodies. This manner of life in a cephalous mollusk, and the property which it possesses of secreting a support, gives it a resemblance to a bivalve shell without a hinge. This support, which is very thick in some species, diminishes insensibly in others, and sometimes becomes very delicate. M. Deshayes states his knowledge of certain species which, instead of secreting a support, attach themselves to other shells, and thereon hollow out to some depth the place on which they live. This impression offers exactly the same form and the same accidents as the more or less thick support above noticed. Between these species and those which live sedentary, without leaving any trace on the body which has served them for a resting place, there exists but very little difference; and it is to be presumed that there is no considerable discrepancy in the organization of the animals. Thus, in his opinion, the passage between *Pileopsis* and *Hipponyx* is established, and the opinion of Lamarck justified.

M. Deshayes goes on to state that the discovery of living *Hipponyces* having a support* is due to MM. Quoy and Gaimard, and that M. de Blainville, to whom these scientific voyagers, on their return from their first expedition, had sent some small individuals preserved in spirit, gives some interesting details relating to the organization of these animals. Afterwards M. Quoy, during his second voyage, had an opportunity of observing larger species, and he found that the *Patella Australis* of Lamarck was a true *Hipponyx* attached upon a very delicate calcareous support. In the highly interesting work published by M. Quoy at the conclusion of the voyage, that zoologist has given very complete details concerning the animals of this genus, which prove most evidently the great analogy which exists between the *Hipponyces* and the *Pileopsides*. The animal is comprised between two fleshy disks, one of which is formed by the mantle and the other by the foot, and when it is entirely detached, it resembles an acephalous animal enveloped in the two lobes of its mantle. But *Hipponyx* differs from the *Acephala* in many points: its head is slightly prolonged into a proboscis, and the mouth is armed with a short tongue, roughened as in the *Patellæ*. The œsophagus is surrounded by a nervous collar, bearing more resemblance to that of the Mollusks properly so called than to that of the Acephalans. These animals are completely hermaphrodites, which incontestably approximates them to the *Lamellibranchiata*;† but the branchial organ is very different, for it is pectinated and formed of straight and rigid lamellæ contained in a cervical cavity and directed from left to right. The *Hipponyces* have, as well as the *Pileopsides*, in front of the foot, vesicles which are more or less numerous, in which the *ova* are deposited, protected by the shell of the mother, and undergoing for a period, the duration of which is not known, a sort of incubation. As the *ova* increase in size, the vesicles diminish in number, but are augmented in volume. Such are the results of the observations made by M. Quoy.

M. Deshayes calls attention to the fact that many of the so-called *Patellæ*—*Patellæ Galathea* and *tricostata*, for example, should be placed among the *Pileopsides*; and that *Patella Australis* should be arranged with the *Hipponyces*.

Mr. Garner seems to be also of opinion that Lamarck has assigned its true place to *Hipponyx*. 'The Patella,' says the former, in his valuable paper *On the Anatomy of the Lamellibranchiate Conchifera* (*Zool. Trans.*, vol. 11), 'when sticking to a rock often forms a hole an inch in depth, and this by the action of its ciliated *branchiæ*; the hole cannot be made by the shell, as it fits exactly in it, and is of such a figure that no rotation can take place. The *Hipponyx*, another Gasteropod, forms cavities in the *Patella* and other shells to which it adheres.'

Mr. Swainson (*Malacology*, 1840) places both *Pileopsis* and *Hipponyx* under his tribe *Scutibranchia*, or *Limpets*.

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* *Quære tamen*; and bear in mind the agency of currents of water produced by the action of *cilia*. [LITHOPHAGIDÆ, PHOLAS, &c. See also post, p. 155.]

* But note. The suspicions of Defrance that *Hipponyx* had a valvular support were confirmed not only by his finding the two valves together on the outside of a *Cerithium* (*C. Cornucopia*), but also by the discovery of an attached valve of *Hipponyx mitrata*. Mr. G. B. Sowerby states that about the same time he was almost persuaded of the same fact by an examination of the upper valve and a comparison which he instituted between it and some specimens of *Orbicula* and *Crania* which had just then fallen into his hands.

† It is now satisfactorily made out that most, if not all of these, with the exception of *Cyclas*, are diœcious.

He makes the genus *Hipponyx* succeed the genus *Emarginula*, and gives *Hipponyx* and *Pileopsis* as subgenera of the former.

Hipponyx. (Defrance.)

Generic Character.—*Animal* oval or subcircular, conical or depressed; *head* globular, carried at the extremity of a sort of neck, on each side of which is a tentacle convex at its base, and terminated by a small conical point; *eyes* placed on the tentacular convexity; *mouth* with two small labial tentacles; foot very delicate, thickened towards its borders, which lessen and enlarge like those of the mantle, to which it bears a complete resemblance; *branchiæ* situated above the origin of the back; *anus* at the right side of the cervical cavity; *oviduct* terminated in a large tubercle at the root of the right tentacle.

Shell conoid or depressed, the apex not spiral; *aperture* with irregular edges; cavity deep, with a muscular impression in the form of a horse-shoe; a rounded lamellar *support*, or an impression on the body serving as the resting place of the animal, presenting also a muscular impression of a horse-shoe shape. (Rang.)

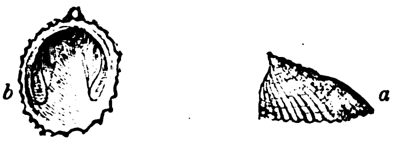
The number of living species given by M. Deshayes in his tables is six; in the last edition of Lamarck the number is three. These are *Hipponyces acuta*, *foliacea*, and *suturalis* of M. Quoy; the first from the seas of New Holland and the two last from the island of Guam in the archipelago of the Marianne islands. To these, according to his own showing, *Patella Australis* should be added; and also the *Patella mitrata* of Linnæus.

Habits, &c.—The genus is marine, and has been found attached to stones and shells at depths varying from the surface to sixteen fathoms.

Example, *Hipponyx acuta.*

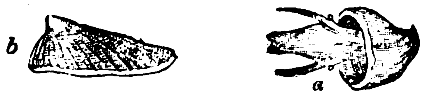
Description.—*Shell* solid, ovate, thickly striated longitudinally, the margin crenulated, violacescent; the vertex long, acute, and straight; white internally.

Locality.—The seas of New Holland.



Hipponyx acuta.

a, the upper valve in situ: *b*, inside view of the same.



Hipponyx acuta, var.

a, the animal; *b*, the shell in situ.

Pileopsis. (Lam. Capulus, Montf.)

Generic Character.—*Animal* conical, slightly spiral at the summit, furnished with a distinct *head* which has a proboscis terminating the *mouth;* in front of the anterior border of the *foot* is a double membrane forming numerous folds; the *tentacles* are nearly cylindrical, stout, obtuse, and carry the *eyes* on small convexities a little above their external base; *foot* large, but very anterior and delicate; *mantle* simple and without ornament; *branchial cavity* open anteriorly; *branchiæ* composed of many narrow and longitudinal laminæ, which adhere by a single transversal line to the *plafond;* orifice of the *anus* towards the right side of that cavity.

Shell irregular, conical, with the apex more or less inclined or spiral, directed backwards; aperture rounded, with simple, irregular, and continuous borders; cavity deep, offering a muscular impression in form of a horse-shoe, open anteriorly. (Rang.)

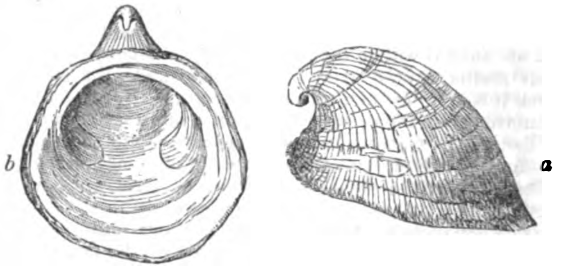
Habits, &c.—This genus, like *Hipponyx*, is entirely marine, and has been taken adhering to shells and stones at depths ranging from the surface to twenty fathoms. The Pacific, the East and West Indies, and the coasts of Europe, are the localities principally known.

The number of living species recorded by M. Deshayes in his tables is seven, and of these one, *Pileopsis Ungarica*, is noted as recent and fossil (tertiary): the number given in the last edition of Lamarck is six, to which, as we have seen, *Patellæ Galathea* and *tricostata* are to be added.

Example, *Pileopsis Ungarica.*

Description.—Shell conico-acuminate, striated; the vertex uncinate and revolute; aperture rather wider transversely; rosy within. The epidermis is somewhat horny, thick, and velvety.

Locality.—The Mediterranean and the shores of the Atlantic. Abundant on our own coasts. One of the best figures we know is given by Mr. G. B. Sowerby, in his *Genera* (No. xxxviii.).



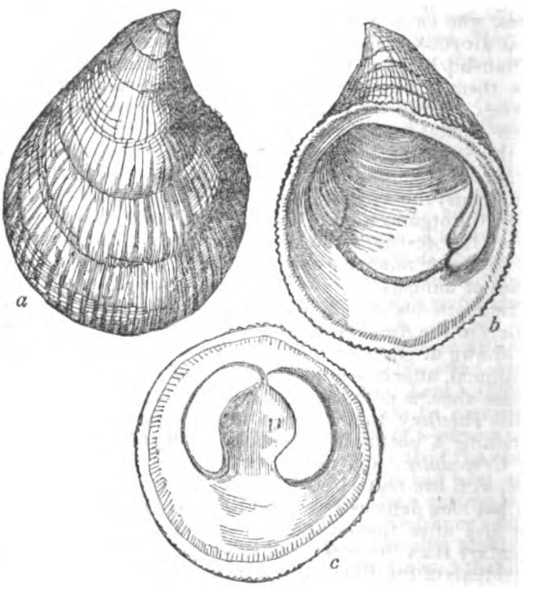
Pileopsis Ungarica.

a, the shell in situ; *b*, inside view of the same.

Fossil Hipponyces and Pileopsides.

Hipponyx. Lamarck has described some fossil species among the *Patellæ* under the name of *P. Cornucopia* and *P. dilatata;* and Mr. G. B. Sowerby (*Genera*) states that all the species known are from the calcaire grossier: (but see below).

The number of fossil species (tertiary) recorded by M. Deshayes in his tables is twelve, and a 'new species' is noted as both living and fossil (tertiary). The localities for these fossils are Sicily, Italy (Subap.), Bordeaux and Dax, Touraine and Turin. Paris is given as the locality for eight. In the last edition of Lamarck six is the number recorded, including *Hipponyx Cornucopia.*



Hipponyx Cornucopia.

a, external view of the upper valve; *b*, internal view of the same; *c*, inside of lower valve.

Pileopsis. Mr. G. B. Sowerby states that he is not acquainted with many recent species, but that several are common among the fossils of the tertiary beds. M. Deshayes, in his tables, gives the number of fossil species (tertiary) as six, *P. Ungarica* being both recent and fossil (tertiary, Baden); the other localities being Sicily, Italy (Subap.), the English Crag, Bordeaux and Dax, and Touraine.

Professor Phillips records *Pileopsis ? trilobus*,* *P. tubifer*, *P. striatus*, *P. neritoïdes*, *P. vetustus ?* and *P. angustus*, from the mountain-limestone formation of Yorkshire and other districts. (*Illustrations of the Geology of Yorkshire*, part ii.)

Mr. Murchison, in his catalogue of the shells of the middle Ludlow rock, records the only imperfect specimen yet obtained from the Aymestry limestone: the aperture appears less expanded than in the *Pileopsis vetusta* of the carboniferous limestone. (*Silurian System.*)

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* Pileopsis is generally considered to be feminine,

PILES, ROGER DE, who belonged to one of the best families in that part of France of which he was a native, was born in the year 1635, at Clamecy, in the province of Le Nivernois, which is now the department of La Nièvre. His parents neglected nothing to give him a solid education, but as he evinced a most decided inclination for the art of painting, he was allowed to follow the bent of his genius. Circumstances however prevented him from devoting himself exclusively to his art. Having been engaged by president Amelot, in 1662, as tutor to his children, he accompanied young Amelot to Italy, and on his return published some essays on painting. He was an intimate friend of Alphonse Dufresnoy, whose Latin poem on painting he translated into French, with explanatory notes. Amelot de la Houssaye, his pupil, having been appointed ambassador to Venice, De Piles was employed as his secretary of legation. He also accompanied him on some other missions: thus he went to Lisbon in 1685, and to Switzerland in 1689, and had the honour to be the bearer to Louis XIV. of the treaty of Neutrality, which his ambassador had just concluded with the thirteen cantons. The reputation which he had acquired both in the arts and public affairs, induced Louis to send him to the Hague, under the pretext of following his profession as a painter, but in fact to enter into secret negotiations with a party in Holland which was desirous of peace. Being discovered, he was arrested by order of the Dutch government; and during his confinement he wrote his 'Lives of the Painters.' When he returned to France, a pension was granted him. Amelot being appointed ambassador to Madrid, De Piles accompanied him, but, his health being very indifferent, the climate of Spain did not agree with him, and he was obliged to return to Paris, where he died on the 5th of May, 1709.

Though his diplomatic occupations prevented him from devoting himself to the study of his art, he had acquired principles which in some measure compensated for want of practice. He was profoundly skilled in chiaroscuro, and there exist several of his portraits which are much esteemed, especially those of Boileau and Madame Dacier. His printed works are distinguished by a clear and unaffected style and refined taste; but his predilection for the Flemish school has sometimes rendered him partial in his judgments. His admiration of Rubens, in particular, was such, that he is said to have preferred him to Raphael. Besides his 'Lives of the Painters,' which have been translated into English, he wrote several other works on painting. A collection of the whole was published at Paris, in 1767, in 5 vols. 12mo. He likewise composed 'Abrégé de l'Anatomie accommodé aux Arts de la Peinture et de Sculpture,' Paris, 1667, fol., with plates, all after Titian. (*French Biographical Dictionary.*)

PILGRIM is the name given to a person who travels for the purpose of visiting the shrines or tombs of holy men, and the act itself is called Pilgrimage. The words pilgrim in English, *pellegrino* in Italian, *pèlerin* in French, are all corruptions of the Latin 'peregrinus,' which means a stranger or foreigner. Pilgrimages to Jerusalem, Bethlehem, and other places which were the scenes of the Saviour's life and death, and which are included in the general name of the 'Holy Land,' began at an early period, probably about the time of Constantine. We are told by Eusebius and others that Helena, Constantine's mother, proceeded on a pilgrimage to Palestine, and built the church of the Holy Sepulchre. The practice became common about the end of the fourth century, and we find it noticed as such by the fathers of the church, Jerome, Augustin, and others. Gregory of Nyssa, in one of his epistles, reproves the indiscriminate custom of pilgrimages, especially by women, who, he observes, were particularly exposed during a long and toilsome journey through countries like Syria, notorious for licentiousness of manners. He adds, that 'pilgrimages are not enjoined by the Scriptures; that the grace of God is not more abundant at Jerusalem than elsewhere; that grace is obtained by faith, and not by change of place; that were grace so plentiful at Jerusalem as people seemed to fancy, the inhabitants of that city would be strangers to sin; instead of which, all kinds of sin were common among them, and especially murder and lasciviousness.' He observes that he himself had once been to Palestine, but it was on a mission of his ministry to the churches of that and the neighbouring country of Arabia, and that he had a conveyance provided by the Imperial officers for him and his attendants; but, he adds, 'I found that my faith was neither increased nor diminished by the sight of Bethlehem and of the Mount of Olives. As I believed before in the mysteries of the Revelation, so I still believed after my visit.' There is much sober sense and sound religion in this letter, which is quite in accordance with the general character of Gregory of Nyssa. Some however have endeavoured to throw doubts on its authenticity; but the letter is quoted among the works of Gregory by Lippomanus, bishop of Methone, in his 'Lives of the Saints:' it is found among the other works of Gregory in an old codex in the Royal Library at Paris; and this account of Gregory's mission to Jerusalem is the same that is mentioned by him in another epistle to Olympius on the death of his sister Macrina. (*Gregorii Episcopi Nyssæ de euntibus Ierosolyma Epistola,* with a Latin translation by Stephanus, Paris, 1606; and again with notes, by P. Molineus, 1607.)

The opinions concerning pilgrimages contained in this epistle are in accordance with those expressed by other fathers of the church. St. Augustin says:—'The Lord did not say, Go to the East to seek justification; or, Sail unto the furthest West in order to obtain forgiveness. But he said, Forgive thine enemy, that thou mayst obtain forgiveness: I ask nothing of thee which is not within thee.' (Sermo III., *de Martyribus.*) Chrysostom, in his Homily I. to Philemon, says:—'In order to obtain forgiveness of our sins, it is not necessary to disburse money; it is not required to travel to distant lands, nor to undergo bodily labours and dangers; but an act of sincere will alone is required.' And Jerome, who was rather an advocate for visiting the Holy Land, yet observes, in his letter to Paulinus:—'The glory of Heaven can be attained from Britain as well as from Jerusalem. Anthony and the other holy monks of Egypt, Mesopotamia, and Armenia, have never visited Jerusalem; and the blessed Hilarion, although a native of Palestine, only visited Jerusalem once in his life. It is not according to places, but according to the internal faith that men are judged.'

In the course of time the practice of pilgrimage increased, and extended to other places besides Palestine. People resorted to the shrines of St. Peter and St. Paul at Rome, to that of St. Iago de Compostella in Spain, of St. Gregory of Tours in France, to the monastery of Einsiedlen in Switzerland, to our Lady of Loreto in Italy, to the tomb of Thomas à Becket at Canterbury, and to several other places.

The use of pilgrimages appears to have been introduced into the Spanish Peninsula about the eleventh century. The pilgrims went to the shrine of some saint, always on foot, and usually in the garb of penitence.' 'The most antient pilgrimage was to the shrine of St. Iago, to which hundreds of thousands from all parts of Europe resorted. The second religious journey was to Rome, to visit the sepulchre of St. Peter, and was then called "Romeria," a custom which may be referred to the eleventh century. The pilgrim to the holy city of Jerusalem, a journey undertaken by few in Spain, except those who wished to atone for some heavy crime, was called a 'palmer,' from the palm-leaf he bore in his hat, just as the pilgrim who had been to Compostella bore the scallop shell. It is doubtless to the influx of so many strangers from all parts that Spain is indebted for some of her numerous legends, and for the chief part of her chivalric lore.' (Dunham, *History of Spain*, b. iii., ch. 4.)

The pilgrimage to the Holy Land was the remote origin of the wars of the Crusades. [CRUSADES.]

In the west, the celebration of the Jubilee perpetuated the custom of pilgrimages to Rome. The institution of the Roman Jubilee is due to Boniface VIII. At the beginning of the year 1300, a report was spread at Rome that all those who should visit the church of St. Peter that year would obtain a plenary indulgence, and that every centenary year enjoyed the same privilege. Pope Boniface searched the antient records for the grounds of this report, and he interrogated a man 107 years old, who told him that in the year 1200 his father, a labouring man, had gone to Rome to get the indulgence, and had advised him, if he should live to the next centenary, to follow his example. Some other old men in France and Italy confirmed this tradition. After con suiting the College of Cardinals, Boniface issued a bull, stating that 'as according to the faithful report of the elders great indulgences are granted to those who visit the church of the prince of the Apostles every hundredth year, we confirm them, and grant plenary indulgence to all those who have confessed, and, being duly repentant, shall visit the churches of the Apostles during the present year, 1300, and every other centenary year after.' This is the origin of the festival which was afterwards called jubilee. Fifty years later, Clement VI. reduced the period of its recurrence to half a century, and styled it jubilee in commemoration of the jubilee of the Jews, which was celebrated every forty-ninth or fiftieth year, when all slaves became free, and all lands returned to their original owners. (*Leviticus*, xxv. 10, et. seq.) This jubilee began at Christmas, 1349, and it was attended by a prodigious concourse of people from all parts of Europe; it is said, more than a million at a time. Petrarca, who went to Rome on that occasion, speaks with wonder of the concourse of pilgrims. The crowd diminished during the heat of the summer, but increased again towards the fall of the year 1350, at which time the nobility, and especially the great ladies, from distant parts came. It appears that these ladies came by the road of the March of Ancona, where Bernardino da Polenta, lord of Ravenna, one of those robber barons of the middle ages, and his men, lay in wait for them, and ravished some of them, and obliged the rest to pay ransom. The chronicler who relates this adds, that 'had they remained at home, such mishaps would not have happened to them;' and that 'indulgences and pilgrimages are not suited to young ladies.' (P. Azar, *Chronica*, fol. 359.) Similar misfortunes are reported to have befallen those ladies who in former ages resorted to Palestine, when pilgrims were exposed to insults and even violence.

Many of the numerous foreigners who resorted to Rome in 1350, not knowing any language except their own, could not confess themselves, and were obliged to employ interpreters. In order to avoid this abuse the popes established the 'Penitentiarii,' or confessors who understand the principal European languages, and who are stationed in the church of St. Peter's, and empowered to give absolution in all cases, even in those generally reserved to the pope. The historian Matteo Villani (b. i., ch. 55), says that on the occasion of the jubilee of 1349, all the Romans had become innkeepers, that they charged enormously dear for everything, and that there was great scarcity, which added to the fatigues undergone by the poorer pilgrims, and the heat of the summer season thinned their numbers to a fearful extent. The cardinal Ceccano, legate of the pope from Avignon, wishing to shorten the stay of the pilgrims, abridged the time allotted for the performance of their devotions, but the people of Rome were so irritated against him for diminishing their chance of gain, that they obliged him to run away from Rome, and he died on the road to Naples, it was said of poison. (*Vita di Rienzi*, fol. 167; Matteo Villani, b. i., ch. 86.)

The period of the recurrence of the Jubilee has been altered several times; some popes reduced it to twenty-five years, in order that each generation should have the advantage of it. The last jubilee was celebrated at Rome in the year 1825, under pope Leo XII. There are foundations at Rome for receiving and feeding the poorer class of pilgrims who resort thither at jubilee time; one of these institutions or hospitals is called la Trinitá dei Pellegrini. The fashion of devotional pilgrimage however has very much decreased in our time. The popes granted to several monasteries the privilege of holding jubilee, with the indulgencies attached to it, every fifty years; among others to that of Canterbury. Concerning former pilgrimages, many notices are found in the antient chroniclers, especially those of the Crusades. Chaucer, in his 'Canterbury Tales,' has given sketches of the pilgrimage to Thomas à Becket's shrine. Henry Watson wrote 'Instructions for Pilgrims to the Holy Land.' Timberlake wrote the 'Travels of Two English Pilgrims to Jerusalem, Gaza, &c. For other particulars see COMPOSTELA; LORETO.

The Mohammedans have also their pilgrimages. According to a precept of the Koran, every Mussulman who possibly can, ought once in his life to visit the tomb of the prophet at Mecca and the Holy Kaaba. [MOHAMMED.] The ceremonies performed by the pilgrims at Mecca are related at length by Burckhardt, Ali Bey, and Planat. (*Histoire de la Régénération de l'Egypte sous Mehemet Ali.*) There are also sanctuaries for the Mohammedans of the sect of Ali at Mushed in Khorassan, and Koom in Irak Ajemi, which contains the tomb of Fatima, the sister of Iman Reza, which are visited yearly by numbers of Persian pilgrims

The Hindus also have their places of pilgrimage, the most celebrated of which is that of Juggernaut or Jagathnatha, on the coast of Orissa in Coromandel, where extensive buildings are allotted for the idol and his priests. The statue of the idol is brought forth at certain periods, and mounted upon an enormous car sixty feet high, which is dragged along by the devout multitude amidst crowds of pilgrims who resort thither from every part of Hindustan. The procession is attended by dancing girls and dissolute young men, who perform acts of obscenity, while fanatics throw themselves under the wheels of the car to be crushed to death. The whole scene, of which Buchanan and other writers give a full account, is a frightful compound of superstition, cruelty, and lust. The revenue derived from the tax on pilgrims is said to be trifling.

The Japanese also are said to have their pilgrimages to the temples of Xinto or Xaca, of which accounts are given by Thunberg and other travellers.

PILING OF SHOT, an instance in which a process of pure mathematics, the summation of series, becomes of immediate application. Three shot, or spherical balls of equal size, placed together on the ground, will support a fourth, and four will support a fifth. Not more than four can be placed together so as to touch each other and support one more. Hence arise two distinct methods of piling shot, the triangular and the rectangular.

In a triangular pile the base is an equilateral triangle, with one shot at the vertex, two adjoining, three in the next row, and so on. The number of shot in the base (supposed to have n rows) is therefore $1+2+3+\ldots\ldots+n$, or $\frac{1}{2}n(n+1)$. The number of interstices in which other shot can lie is $1+2+3+\ldots+n-1$, or $\frac{1}{2}(n-1).n$. If such a pile be completed until one shot stands at the vertex, the pile will be n layers high, and counting from the top, the layers will severally contain $1, 3, 6, 10, \ldots\ldots \frac{1}{2}n(n+1)$, of which the sum

$$\frac{n(n+1)(n+2)}{6}$$

is the number in a complete triangular pile.

Let there be a rectangular base, say of 16 by 11 The number of interstices is 15 by 10, and when the second layer is put on, the number of interstices is 14 by 9, and so on; whence the eleventh layer is a single row of 6. If a and $a+b$ be the numbers in the longer and shorter sides of the rectangular base, the number in the complete pile is

$$\frac{a(a+1)(2a+1+3b)}{6}$$

If the base be a square, $b=0$, and the number in the pile is

$$\frac{a(a+1)(2a+1)}{6}$$

PILLAR. [COLUMN.]

PILLAU, a seaport in the circle of Fischhausen in East Prussia, in 54° 33′ N. lat. and 19° 52′ E. long., was founded in 1772, and has only 3000 inhabitants besides 1000 in the fortress. It is situated at the extremity of a tongue of land or peninsula between the Baltic and the Frische Haff. [FRISCHE HAFF.] It is a place of considerable importance, for as the Haff is too shallow to allow large or heavily laden ships to go up to Königsberg and Elbing, they are either lightened of part of their cargo, or remain at Pillau, and the goods are conveyed to those ports by lighters (here called *Bordinge*), which also bring back the return cargoes. In the year 1839, 1420 ships cleared inwards, and 1439 outwards. Near to the town there is a strong fortress, which defends the entrance of the Frische Haff. Besides the employment afforded by the maritime commerce, Pillau derives great advantages from its fisheries, especially of sturgeons, from the roe of which caviare is prepared. About five miles from the Haff there is a fine forest of hornbeam, which is called the Prussian Paradise. To the north-west of the town begins what is called 'the Amber Coast,' this circle producing a greater quantity of amber than any other part of Prussia. In this circle too is the Kapora heath, where elks are still found. The winds on this coast often tear up the trees and drift the sand into heaps, so that the inhabitants are compelled to remove their habitations from one place to another. Near to Pillau there are two villages—Old Pillau, where there is a lighthouse 100 feet high, and Wogram, where there is a large building for preparing caviare. (Stein's *Handbuch*; Müller's *Wörterbuch*.)

PILLNITZ is a celebrated country-seat of the kings of Saxony, the usual summer residence of the court, near the village of the same name, and situated in a beautiful country on the right bank of the Elbe, about five miles from Dresden. Pillnitz was formerly an old castle. In 1693, the Elector John George IV. purchased it of Heinrich von Bünau, and made a present of it to his mistress, the countess of Rochlitz, on whose death it reverted to the crown. Frederick Augustus I. (Augustus II. as king of Poland) gave it, in 1705, to the countess of Cosel. It was afterwards the summer residence of field-marshal Rutowski. Augustus II. however chose to reside there himself, and built two palaces, which were magnificently fitted up, and were afterwards inhabited during the summer by the family of the king. Since the year 1788, the whole has been much improved, but the mixture of the Chinese, Japanese, and Italian styles of architecture gives it a singular appearance. Four detached pavilions form the four corners of a square, which is bounded on the west by the royal gardens, and on the east by the buildings of the old palace. Between the two southern pavilions stands the Water Palace, and between the two northern what is called the Berg Palace. The old palace, containing the temple of Venus, with the portraits of the beauties of the reign of Augustus II., was burnt to the ground in 1818. A new edifice has been erected on its site, which contains a spacious banqueting-room, adorned with fine paintings in fresco, by Professor Vogel, of Dresden, and partly lighted by a dome supported by twenty pillars. The palace contains also a chapel and a theatre. Behind the village there is a romantic valley called Frederichsthal, leading to the Borsberg, a mountain nine hundred feet high, from the summit of which there is a splendid view of the valley of the Elbe, from Meissen to Köningstein, bounded by the high land of Meissen, Bohemia, and the Erzgebirge.

Pillnitz has become famous in modern times for the congress of princes which met here from the 25th to the 27th of August, 1791, and at which the Emperor Leopold II., King Frederick William II., the archduke afterwards Emperor Francis, the crown-prince (the late King Frederick William III.) of Prussia, the count of Artois (Charles X.), the ex-minister Calonne, and the marquis de Bouille deliberated on the measures to be adopted against the French revolution. The congress did not conclude an offensive alliance against France, but it was resolved to act in common and to oppose any attack on the part of France. The defensive alliance between Russia and Austria, provisionally agreed on at Vienna, on the 25th of July, and definitively concluded at Berlin, on the 17th of February, 1792, was merely a subject of conversation at Pillnitz. The brothers of the king of France received, on the 27th of August, a declaration from Austria and Prussia, which the French considered as the foundation of the coalition against France. (Stein; Cannabich; *Conv. Lex.*; Engelhardt, *Sachsen*.)

PILLORY. The pillory was a mode of punishment for crimes by a public exposure of the offender, used for many centuries in most of the countries of Europe under various names. In France it was called *pillorie*, and, in more recent times, *carcan*; and in Germany, *pranger*. In England it existed before the Norman conquest, and was in frequent use in our criminal law from that period until within the last thirty years. It was finally abolished in the year 1837, by the statute 1 Vict., c. 23. In the laws of Canute (Wilkins's *Anglo-Saxon Laws*, p. 11) it was called *healfange*, or, more correctly perhaps, *halsfang*, *i.e.* catch-neck, a name derived, without doubt, from the form of the instrument used, and the mode in which the punishment was inflicted. Hence also the Latin name of the pillory, *collistrigium* (quasi collum stringens), is said to be taken. (Cowell's *Interpreter*, ad. voc. 'Pillory.') The tumbrel, *trebuchetum*, an obscure punishment, which is said to be the same as the ducking or cucking stool, and was used for women, who were exempted, on account of their sex, from the pillory, is often spoken of in the antient English laws in conjunction with the pillory. In early periods of English history, the right of having a pillory and tumbrel, and sometimes also *furcæ*, or gallows, within their jurisdiction, was claimed and insisted on as a beneficial franchise by lords of leets: in process of time this privilege was converted into a burthen for the public use; and such persons were held to be bound to maintain a pillory and tumbrel as appurtenant to their criminal jurisdiction, on pain of forfeiture of their franchises. (Hawkins's *Pleas of the Crown*, book ii., cap. 11, sec. 5.) In like manner the 'Droits de Carcan et de Pillori' are mentioned in antient French customaries as belonging formerly to seigneurs haut-justiciers. (Vouglans, *Loix Criminelles de France*, p. 66.)

The form of the pillory as used in England in the time of Henry VII., may be seen in a collection of prints published by the Society of Antiquaries. In modern times it was nothing more than a wooden frame or screen, raised several feet from the ground, and behind which the culprit stood, supported upon a platform, his head and arms being thrust through holes in the screen, so as to be exposed in front of it; and in this position he remained for a definite time, sometimes fixed by law, but usually assigned at the discretion of the judge who passed the sentence. The form of the judgment was that the 'defendant should be set *in* and *upon* the pillory.' In a case which occurred in 1759, an under-sheriff of Middlesex was fined fifty pounds and imprisoned for two months by the Court of King's Bench because, in executing the sentence upon Dr. Shebbeare, who had been convicted of a political libel, he had allowed him to be attended upon the platform by a servant in livery, holding an umbrella over his head, and to stand without having his neck and arms confined *in* the pillory. (Burrow's *Reports*, vol. ii., p. 791.)

The pillory was intended 'magis ad ludibrium et infamiam quam ad pœnam;' but serious injury, and, in some cases, loss of life, has occurred where the populace have been much excited against the offender. (Barrington's *Antient Statutes*, p. 56, note.) On the other hand, where the unpopularity of the prosecution or other causes have occasioned a feeling in the public mind favourable to the offender, the execution has sometimes been a species of triumph. This occurred in the case of Eaton, an aged person, who was convicted of an irreligious libel in 1812, at a period of much political excitement; and who, when exposed in the pillory, was received with demonstrations of respect and sympathy, the mob taking off their hats, and individuals offering him wine and refreshments.

The public exposure of the offender as a punishment is liable to many objections, besides the inequality of its operation; and the efficacy of all punishmentss which merely disgrace the offender has been questioned by some of the most distinguished modern writers on criminal law. (Rossi, *Traité de Droit Pénal*, p. 483; Haus, *Projet de Code Pénal Belge*, vol. i., p. 143.) In consequence of the recent direction of the public opinion to this subject, punishments of this kind have been lately withdrawn from most of the modern systems of penal law in Europe. In England the pillory was abolished in 1837, by the statute above referred to; in France, the carcan was discontinued upon the revision of the Code Pénal in 1832; and in the numerous codes and schemes of codes which have appeared in the different states of Germany during the last 10 years, punishments by public exposure of the person or otherwise tending generally to degrade the character have been omitted. (*Entwürfe für Würtemberg*, *Sachsen*, *Hannover*, *Baden*, &c.) It is remarkable that the Bavarian code of 1813, which is generally founded on just and enlightened principles of criminal law, and which formed the commencement of the series of improvements which have since taken place in Germany, contains the objectionable provision that a criminal capitally convicted shall, in certain aggravated cases, undergo a public exposure on the *pranger* for half an hour previously to his execution. (*Strafgesetzbuch für Baiern*, art. 6.)

PILOT. In many maritime countries the name of pilot is applied to a constant officer in a ship, who has the charge of the helm and the general direction of the ship's course; and also to a person who undertakes the special charge of navigating ships in particular rivers, roads, or channels, or in entering and leaving ports, and who is entrusted with such charge independently of the captains or masters, in consequence of his peculiar acquaintance with the navigation within the limits to which his duty is restricted. In France large vessels usually carry several officers of the former kind, who are called *pilotes hauturiers;* the latter description of pilot is called *pilote côtier*, or *lamaneur*.

The antient laws of France contained provisions for the education and regulation of both these kinds of pilots (Merlin, *Répertoire de Jurisprudence*, art. 'Lamaneur et Pilote;' Valin, *Commentaire sur l'Ordonnance de la Maine du Moi d'Aout*, 1681, tom. i., p. 483); but they are not mentioned in the Code de Commerce. In England the term is applied exclusively to officers of the latter description. By the laws of many maritime countries, taking a pilot to navigate a vessel on approaching port has been considered from early times to be obligatory on the master. Thus by the laws of Wisbuy, which were promulgated in the twelfth century, and were incorporated in the marine laws of most European countries, it was compulsory on the master to take a coast-pilot on board, though the merchant or master opposed it. (*Ordonnances de Wisbuy*, art. 44.) A similar provision is found in the *Consolato del Mare*. (Boucher, *Consulat de la Mer*, vol. ii., p. 429.) In this country, pilots are established at several ports for limited parts of the coast, who are appointed and regulated sometimes by acts of parliament, and sometimes by charters of incorporation; and in general the master of a ship engaged in foreign trade must put his ship under the charge of such a pilot, both in his outward and homeward voyage, within the limits of every such establishment. Pilotage in the Thames and Medway, and along the coast, from Orfordness to the Isle of Wight, excepting the jurisdiction of the Cinque Ports, has been for several centuries under the management of the corporation of the Trinity-house, and acts of parliament have been from time to time passed to regulate the Trinity-house and Cinque Port pilots. All these regulations were reconsidered by parliament in the year 1825, and the majority of them were consolidated in the statute 6 Geo. IV., c. 125, which contains also some general provisions respecting pilots in other parts of the kingdom. (Abbott *On Shipping*, p. 173, edit. 1840.)

PILSEN, a fortified town, the capital of a circle of the same name, is one of the principal towns in the kingdom of Bohemia. It is situated in the midst of fertile fields, in a beautiful and extensive valley, at the conflux of the Bradawka and the Beraunka, also called the Mies; in 49° 45′ N. lat. and 13° 25′ E. long. It is on the whole a well-built town, and the houses are mostly of stone. It has three suburbs, and 9000 inhabitants. The most remarkable public buildings are—1, the fine Gothic church of St. Bartholomew (probably built by the Teutonic Knights in 1292), with several fine paintings, and a steeple 180 feet high; 2, the elegant gymnasium; 3, the Gothic town-hall; and 4, the house of the Teutonic knights. Besides the gymnasium, there are a military academy, a philosophical institution, with six professors, and a lyceum. Pilsen has considerable manufactories of cloth and morocco leather. There are four annual fairs, which are much frequented by persons from all parts of the kingdom. The inhabitants carry on an extensive trade in the productions and manufactures of Bohemia, and in cattle, iron, potashes, feathers, wool, leather, cloth, &c. This trade has been much increased by the exertions of a patriotic joint-stock society, which has constructed an iron railway from Pilsen to the gates of Prague, where it divides into two branches, one of which goes to the river Moldau, by which the railway communicates with the Elbe; and as Pilsen is connected by the principal roads with the south and west of Germany, considerable quantities of manufactured goods and merchandise, brought up the Elbe from Hamburg, &c., are conveyed by the railway to Pilsen, where they are forwarded to their ulterior destination. This brisk trade, the fairs, and the presence of a numerous garrison, make this a very lively place. (Hassel; Stein; *Oester. Encyc.*)

PILUMNUS, Dr. Leach's name for a genus of brachyurous crustaceans.

Generic Character.—*External antennæ* setaceous, rather long, slender, inserted in the internal canthus of the eyes; *internal antennæ* situated in the transverse fossets of the *chaperon*. Third joint of the *external jaw-feet* nearly square, subtransverse, notched towards its end and internally. Second, third, fourth, and fifth pairs of feet terminated by simple sharp nails. *Carapace* transverse, truncated posteriorly. *Abdomen* of the females ellipsoïd and elongated. *Ocular peduncles* short and larger than the eyes; a fissure at the bottom of the orbit above and another below.

This genus very much resembles the *Crabs* properly so called; but differs from them principally in the number of pieces in the abdomen of the male, and is removed from them still further by the mode of insertion of the external antennæ.

M. Milne Edwards, who arranges the genus under his *Cancériens Arqués* [PLATYCARCINUS], is of opinion that *Pilumnus* approaches *Xantho* and *Pseudocarcinus* very closely. He divides the species, which are numerous, into several sections, according to the absence or presence of spines on the latero-anterior borders of the carapace, and according to the granular or spiny external surface of the pincers.

Example, *Pilumnus hirtellus*, Leach (*Cancer hirtellus*, Linn.).

Description.—Carapace with four or five dentilations on each of its latero-anterior borders; hands and carpus granulous above and externally; body pale yellowish mixed with brown or red in bands on the feet; both body and limbs bristly with brown stiff hairs. Size rather small.

Locality.—The coasts of England and France; generally found under stones. (Leach, *Malac. Brit.*, t. 12; Penn., *Brit. Zool.*, vol. iv., pl. 6, lower figure.)

PIMENTA, or **PIMENTO**, the produce of *Eugenia Pimenta*, a tree native of the West Indies, but cultivated almost exclusively in Jamaica, thence called Jamaica pepper. The unripe two-seeded berries, which are about the size of a pea, are dried by frequent turning in the sun, by which their colour is changed from green to brown or greyish-brown. Externally they are of a dull appearance, somewhat rough, crowned with the remains of the calyx, and frequently furnished with a little stalk. The shell is very brittle, about the thickness of a card, and encloses two seeds, which are roundish, dark brown, somewhat shining, and having a weak aromatic taste. The shell possesses an agreeable clove-like taste and smell. Two kinds are met with in commerce, English and Spanish, of which the former is the better.

Pimento berries are said to be adulterated with the berries or seeds of the Cocculus Indicus; these are larger, about the size of bay berries, extremely bitter, and, in large quantity, poisonous. This adulteration is scarcely credible, for the latter come from the East Indies, are dearer, and could only be successfully passed off when mixed with the powdered berries of pimento. The fraud may be detected by making an infusion, which, if pure, is not disturbed by tincture of galls or acetate of lime, which cause a precipitate when cocculus berries are present.

The shell appears to be the most efficient part, and to contain more of the active principles.

Bonastre obtained from them 10 per cent. of a heavy volatile oil, 8 per cent. of a green fat oil, an extractive containing tannin, resin, gum, and sugar; also a principle similar to caryophyllin.

By distillation an oil is procured which resembles oil of cloves, and which conducts itself in the same way towards alkalis.

As an aromatic stimulant, pimento stands intermediate between pepper and cloves, for the last of which, on account of its greater cheapness, it may often be substituted.

It is useful in dyspepsia dependent upon atony of the stomach, and in diarrhœa dependent upon a similar cause.

PIMPERNEL is the English name of the *Anagallis arvensis*, a little red-flowered prostrate annual found in cornfields. It is often called the Shepherd's or Poor Man's Hour-glass: it opens its flowers every morning about ten minutes past seven in these latitudes, and closes them a few minutes after two. If rain falls or the air is charged with moisture, the flowers do not open at all.

PIMPINELLA, a genus of umbelliferous plants inhabiting the meadows and mountains of Europe principally, is chiefly interesting on account of its comprehending among its species the Anise of the shops. This plant is an annual, with a smooth stem 1 to 1½ foot high; the lower leaves roundish, cordate, lobed, and both serrated and cut; those of the stems pinnated with wedge-shaped lanceolate segments, and the upper trifid, with the lobes undivided and linear. The flowers are small and white. The fruit is narrow, slender, rather hairy, with 5 filiform ridges to each mericarp. The latter is employed extensively as a carminative medicine, and for the purpose of flavouring liqueurs. The plant inhabits Egypt and the islands of the Grecian archipelago, especially Scio.

Of ANETHUM, formerly referred here by mistake, mention has already been made under DILL.

PIMPINELLA A'NISUM. [CARMINATIVES.]

PIN. This simple and well-known little instrument, when considered as an article of trade, is far from trivial, and its manufacture affords an admirable example of the principle of the 'division of labour,' for which purpose it has been employed by Mr. Babbage, in his introduction to the volume on mechanics, in the 'Encyclopædia Metropolitana,' to which we acknowledge our obligation for several valuable hints upon this subject.

It is not known at what time pins made of metal of the present form were first manufactured in this country, but it must have been some time previous to 1543, in which year a statute was passed (35 Henry VIII., c. 6), intituled 'An Acte for the True Making of Pynnes,' in which, after stating that much deceit had been practised in the making of pins, it was enacted that in future none should be sold but such as were well pointed and had the heads firmly soldered on to the stems, and further that the price charged should not be more than six shillings and eight pence a thousand. No mention is made of them in any previous statute, with the exception of an act of Richard III., which prohibited their importation from abroad, but the pins there alluded to were much larger than those now in use, and were made of box-wood, bone, or silver.

Pins of English manufacture being in great repute abroad, the foreign trade is very considerable, and the number actually made in this country daily has been stated at fifteen millions, an estimate which we are inclined to believe considerably below the actual quantity.

The most profitable mode of producing pins by hand labour seems to be by distributing the operations amongst ten persons, of whom four should be men, four women, and two children. By these means the manufacturer secures exactly the amount of talent requisite for his purpose at the lowest possible cost. The wages earned by these persons vary from 4½*d.* to 6*s.* a day. Now it is evident that a workman who could earn six shillings a day would be unprofitably employed, as regards the master, if he were paid at that rate to perform work of an inferior description, and which could be done as well by another person for smaller wages. Hence arises the necessity of dividing the operations in all manufactures among persons of different capacities, and of employing them in certain ascertained proportion. For pin-making then the number of persons employed should be ten, or any number that can be divided by ten without a remainder.

Ten persons can produce a pound, or about 5500 pins of medium size, in rather less than eight hours, each person taking up the work as soon as the operation preceding that which he or she has to perform is completed, and each being employed about a tenth part of the eight hours.

The cost of labour for producing such pound of pins is less than thirteen pence. The amount paid for labour alone in the production of this article in this country annually cannot be much short of seventy or eighty thousand pounds, to which must be added the cost of the material, carriage, profit, &c.,—an enormous sum considering the apparent insignificance of the article.

Manufacture.—The first thing to be done is to reduce a quantity of brass wire to the requisite size. This, though properly speaking a preliminary operation, is generally done in the pin-factory, as the wire is received of larger diameter than necessary. It is performed in the usual manner of wire-drawing, and the wire is then made up into coils of six inches diameter, and any dirt or crust which may be attached to the surface is got rid of by first soaking the coils in a diluted solution of sulphuric acid and water, and then beating them on stones. The next process is to straighten the wire, which is performed in the following manner:—Two short lines, parallel to and very close to each other, are drawn at one end of a board or table, and seven or nine pins are driven into the wood, at a short distance apart, alternately in the two lines. The end of the wire is placed between these two rows of pins and is thus held in a zig-zag position: it is then drawn between the pins to the other end of the table, and a length of about twenty feet is cut of. This process is repeated until all the wire is straightened and cut into similar pieces. A number of these lengths are then taken together, and by means of a powerful pair of shears, worked by the foot, they are cut up into shorter pieces, each a little longer than six pins. These latter pieces are then pointed at each end, in the following manner — The person so employed sits in front of a small machine, which has two steel wheels or mills turning rapidly. These wheels are usually about six inches in diameter, and their rims or cutting surfaces are about three inches broad. These rims are cut somewhat after the manner of a file, one coarse, for the rough formation of the points, and the other fine, for finishing them. Several of these pieces are taken in the hand, and by a dexterous movement of the thumb and fore-finger are kept continually presenting a different face to the mill, against which they are pressed. The points are then finished off by being applied in the same manner to the fine mill. After both ends of the pieces have been pointed, one pin's length is cut off from each end, when they are repointed, and so on until each length is converted into six pointed pieces. The stems of the pins are then complete. The next step is to form the head, which is effected by a piece of wire called the mould, the same size as that used for the stems, being attached to a small axis or lathe. At the end of the wire nearest the axis is a hole, in which is placed the end of a smaller wire, which is to form the heading. While the mould wire is turned round by one hand, the head wire is guided by the other, until it is wound in a spiral coil along the entire length of the former. It is then cut off close to the hole where it was commenced, and the coil taken off the mould. When a quantity of these coils are prepared, a workman takes a dozen or more of them at a time in his left hand, while with a pair of shears in his right he cuts them up into pieces of two coils each. To prevent them flying off from the shears when separated, the fore-finger of the left hand is applied to the tip of the coil, and the end thus cut off is caught in a bowl placed beneath it. In some factories this is performed by a chisel and gage, instead of the shears, and has the advantage of requiring less dexterity. The heads, when cut off, are annealed by being made hot and then thrown into water. When annealed, they are ready to be fixed on the stems. In order to do this, the operator is provided with a small stake, upon which is fixed a steel die, containing a hollow the exact shape of half the head. Above this die, and attached to a lever, is the corresponding die for the other half of the head, which, when at rest, remains suspended about two inches above the lower one. The workman takes one of the stems between his fingers, and dipping the pointed end into a bowl containing a number of the heads, catches one upon it and slides it to the other end; he then places it in the lower die, and, moving a treadle, brings down the upper one four or five times upon the head, which fastens it upon the stem, and also gives it the required figure. There is a small channel leading from the outside to the centre of the dies, to allow room for the stem. The pins are now finished as regards shape, and it only remains to tin or whiten them. A quantity of them are boiled in a pickle, either a solution of sulphuric acid or tartar, to remove any dirt or grease, and also to produce a slight roughness upon their surfaces, which facilitates the adhesion of the tin. After being boiled for half an hour, they are washed, and then placed in a copper vessel with a quantity of grain tin and a solution of tartar; in about two hours and a half they are taken out, and after being separated from the undissolved tin by sifting, are again washed; they are then dried by being well shaken in a bag with a quantity of bran, which is afterwards separated by shaking them up and down in open wooden trays, when the bran flies off and leaves the pins perfectly dry and clean.

Papering the pins for sale is the longest operation in pin-manufacture, with the exception of shaping and fastening on the heads. This latter operation consumes four hours, and the former more than two hours out of the eight required for producing a pound of pins. When the pins are separated from the bran, as before described, they are thrown into bowls, with their points in all directions, and before papering it is necessary to arrange them all the same way. This is done by laying a number of them upon a sort of comb, between the teeth of which they are caught by the head; they are then placed upon a piece of metal, with as many grooves as there are pins required in a row, and held there by another piece of metal being placed upon them. These pieces of metal are not quite so broad as the pins are long, so that their points project beyond the edge of the metal. The paper is folded into the required shape, and pressed against the points of the pins, which are then relieved from the holder, and the next row is arranged in like manner.

Of these operations, drawing the wire, cutting it into lengths, cutting the heads from the coils, and tinning, are performed by men, and the rest by the women and children. The fixing on the heads of the pins expeditiously and firmly has always been a matter of considerable difficulty, and many means have been resorted to and several machines invented to effect this purpose. Among the machines may be mentioned that of Mr. Rundy, for which a patent was taken out in the year 1809. This machine fixed on the heads in the old manner, but more firmly. Each head was fastened by one blow, and several pins were operated on at the same time. Since that time several other machines have been invented for forming the head out of the stem of the pin itself, by pressing a small part of the end of the stem into a hollow die. A large proportion of the pins now manufactured are made in this way, and are much superior to those made in the old fashion. One objection however has been urged against them. It is stated that to form the head in this manner by pressure, the wire requires to be very soft, and consequently the pins will easily bend. This certainly is a great disadvantage. We have seen some pins of which the heads were formed by curling the end of the stem round upon itself and then shaped by being struck in a die, but these would be open to the objection just mentioned. The only method that occurs to us of remedying this fault is to partly produce the head by an operation similar to that of wire drawing. The stem of the pin being drawn through the plate would be rendered much less liable to bend, and the head being half formed by such operation, but left soft, might be finished in a die as in the present machines. We are not aware that any method of this sort has been tried and therefore we merely throw it out as a suggestion.

We shall conclude by giving a slight sketch of the pin-making machine invented by Mr. Wright, and for which a patent was granted to him in May, 1824.

Motion is given either by manual power or by machinery to a strong axis working in collars. This main axis carries several cams or excentric wheels which put forward at each revolution as many levers or slides at right angles to the main axis. These levers return to their former situation as soon as the cam ceases to operate by means of a strong spiral spring attached to each; at the other ends of these slides the different operations are performed.

A coil of brass-wire of the requisite size is placed upon a reel and spindle, and the end is drawn through a set of zigzag pins as before described for straightening the wire, and placed between the teeth of a strong pair of pincers. This is all that is necessary to be done before setting the machinery in motion.

The first slide then moving forward shuts the pincers upon the wire and instantly carries it forward into a nipping-gauge which closes and cuts off sufficient for one pin. This length can be regulated by the adjustment of a small screw attached to the first slide.

The piece thus cut off is carried by an ingenious little adaptation called a carrier to the next operating slide. These carriers are four in number, mounted on a bar at right angles to the working slides and parallel to the main axis; this bar has a motion given to it in the direction of its length, and moves once for every pin-length of wire cut off by the gauge before mentioned. The carriers themselves are made somewhat in the manner of a pair of pliers, the under chap being kept up to the other by a spring. The juncture of these chaps is exactly opposite to the pin, which is forced between the chaps and carried to the next operation.

The piece of wire is deposited by the first carrier in the centre of a chuck attached to a small mandril, which by a moveable lever clutches the pin; the instant this is done, the frame which supports the mandril is tilted so as to bring the point of the pin down upon a revolving steel mill just below it; a lever or finger then presses the end of the wire upon the mill, and at the same instant the mandril carrying the pin is set in motion and the wire ground to a point; the mandril frame then rises, the mandril itself is brought to rest, the pin released, and conveyed by the second carrier to a finer mill, where the point is completed by exactly the same process as the preceding.

It is then taken by the third carrier to the first heading die, where the body of the pin is firmly held while a steel punch advances against the end of the wire, and forcing it into a hollow in the die, partially forms the head. The last carrier then takes the pin, and placing it in another die, the head is completed by another punch; a small forked lever then draws the finished pin from the die and drops it into a receptacle below. The pins are then tinned in the manner previously described. These operations are carried on by the machine simultaneously, and each occupies the same time; five pins being constantly under operation in the different stages; the machine will produce fifty or sixty pins per minute, and only requires the attendance of one person.

The reader is referred to the 9th volume of the *London Journal of Arts and Sciences*, where he will find a full description of the above machine, illustrated by numerous engravings.

Mourning pins may be made of brass, in the manner above described, varnishing being substituted for tinning; but those made of steel wire, tempered to a deep purple, are much neater as well as stronger.

PIN MONEY. Gifts by a husband to his wife for the purchase of apparel, ornaments for her person, or for her private expenditure, are called pin-money; and such gifts may either be made during marriage, or, what is the more usual case, a sum of money for that purpose may be secured by the husband to his wife by settlement, or by articles executed before the marriage. Perhaps it is only money secured before marriage for the purposes enumerated that is properly called pin-money; for a gift of money by the husband to the wife after marriage is liable to the husband's debts; but a provision for pin-money is not so liable, and the wife is entitled in all cases to such money, and to her savings out of it, and things bought with it.

Several of the questions upon pin-money have arisen after the husband's death when arrears have been claimed by the wife; and it is the general rule that she can only claim arrears of one year's pin-money if she has been supported by the husband with necessaries during the time that such arrears have accumulated, it being presumed from the fact of arrears accumulating, and her wants in the meantime being supplied, that she has waved her claim to pin-money; but she may by evidence rebut such presumption. If it is expressed in the settlement or articles that the pin-money is given for a particular purpose, as for the wife's apparel, and it is proved that the husband provided apparel for the wife, she has no claim after his death to any arrears of pin-money.

If the husband leave a legacy to the wife equal to the arrears of pin-money or more, such legacy, according to the general rule as to the satisfaction of debts by the giving of legacies, will be considered as a payment of the arrears due at the time when the will was made. If a wife elope and live apart from her husband, either in a state of adultery or not, she does not thereby forfeit her right to her pin-money, and she may recover it.

PINA. [PORTUGAL.]

PINCIA'NO. [NUNEZ.]

PINDAR, son of Daiphantus (or, as others say, of Pagondas, or Scopelinus) and Clidice, was born at Cynoscephalæ, a village between Thebes and Thespia, in Ol. 65, 3 (B.C. 518), according to Clinton (*Fasti Hellen.*, iii., p. 609), or in Ol. 64, 3 (B.C. 522), according to Böckh (Pindar, tom. iii., p. 14), and died, according to the former computation, in B.C. 439, according to the latter in B.C. 442, having completed his eightieth year. He was born at the time of the Pythian games (about the beginning of July: Arnold, Thucyd., ii., p. 418), and he speaks himself (*Fragm. incert.*, 102) of 'the festival recurring at the beginning of every five years, at which I was first laid upon the bed in swaddling clothes.' His wife was Megaclea, daughter of Lysitheus and Callina: he seems also to have been married to a woman named Timoxena: he had a son Daiphantus, and two daughters, Eumetis and Protomache.

Pindar's family were hereditary flute-players; their profession was of great reputation at Thebes, though flute-playing did not come much into fashion at Athens till after the Persian war. Accordingly he seems to have applied himself at first to that branch of poetry which was peculiarly adapted to a flute accompaniment, and his first instructor was Lasos of Hermione, a celebrated dithyrambic poet, whose favorite instrument was the flute. (Plutarch, *De Mus.*, c. 29.) But Thomas Magister, in his 'Life of Pindar,' says that his father began to teach him the flute, and finding that his capacity was of a higher order, placed him under Lasos, who initiated him into lyric poetry. It is clear however, from what we know of the style of Lasos, that he could not have had much to do with the formation of Pindar's style as a lyric poet. It is more probable that Pindar, as is expressly stated, profited chiefly by the advice and example of Corinna, the Tanagræan poetess, whose odes were of the same mythical character with those of Pindar, and who was not an imitator of the Lesbian school, but a teacher of choruses, like Pindar himself. Plutarch tells us (*De Glor. Athen.*, c. 4) that Corinna recommended Pindar to introduce mythical narratives into his odes, for that this was the proper business of the poet—the rhythm, music, and ornamented diction being only vehicles of the subject-matter; and that when, in obedience to her suggestion, the young poet composed a hymn full of Theban mythology, she remarked with a smile, that 'he ought to sow with the hand, and not with the whole sack' (*τῇ χειρὶ δεῖν σπείρειν ἀλλὰ μὴ ὅλῳ τῷ θυλάκῳ*). This Corinna frequently contended against her pupil in the musical contests, and gained five victories over him (Pausan., ix. 22; Ælian, *V.H.*, xiii. 24), though she found fault with the poetess Myrtis for doing the same thing: 'I blame the clear-toned Myrtis, I, that she, a woman born, should enter into rivalry with Pindar.' (Apollon. Dyscol., *De Pronom.*, p. 64, B.) He had another instructor, Agathocles, or Apollodorus, of Athens, who allowed him to teach the cyclic or dithyrambic chorus there, while he was a mere boy. Pindar must have commenced at a very early period his career as a professional composer of choral odes for special occasions. At the age of twenty he composed an Epinician ode in honour of Hippocles, or Hippocleas, of Pelinna in Thessaly, who had won the prize at the Pythian games; and this ode, which is still extant (*Pyth.*, x., composed in B.C. 502), exhibits no marks of a want of skill or practice on the part of the author. He soon rose to the highest rank in his profession, and spent his long life in lucrative intercourse with the tyrants and wealthy men of Greece and its colonies. The free states vied with one another in honouring the great lyric poet. He had the *προξενία*, or complimentary franchise at Athens, Ægina, and Opus; and although the people of Ceos had two celebrated poets of their own, namely, Simonides and Bacchylides, they employed Pindar to compose a *προσόδιον*, or procession-ode, for them. At Delphi he had an iron chair to sit upon when he sang the Apollinean hymns (Pausan., x., 24, sec. 4), and, by order of the Pythia, he received a portion of the banquet of the Theoxenia. (Plutarch, *De Sera Num. vindict.*, c. 13.) A long time after his death, and not, as the pseudo-Æschines states, in his lifetime, his statue was erected at Athens (*πρὸ τῆς βασιλείου στοᾶς*). He was courted by Hiero, tyrant of Syracuse; by Thero, tyrant of Agrigentum, and his brother Xenocrates; by Thrasydæus, son of Thero, and Thrasybulus, son of Xenocrates; by Arcesilaus IV., king of Cyrene; by Thorax, one of the Aleuadæ; and by Alexander, the son of Amyntas, king of Macedon, who was an active patron of lyric poetry. Pindar, as might have been expected, from the nature of his employment, was very religious, or, rather, very observant of particular superstitions. He had consecrated a temple to the Magna Mater and Pan near his own house at Thebes; this was probably in his character of hereditary flute-player, for the Magna Mater and Pan were Phrygian deities, in whose honour the first flute-music was composed. He also dedicated statues to Jupiter Ammon, and to Mercury of the Agora, and also perhaps to Apollo Boëdromius.

The entire specimens of Pindar's works which have come down to our time (with the exception of the 11th Nemean) belong to one class, that, namely, of the Epinician or triumphal odes. Besides these however Pindar wrote dithyrambs, pæans, dirges, drinking songs, mimic dancing songs (*ὑπορχήματα*), songs of maidens (*παρθένεια*), and encomia or panegyrics on princes, of all which we have numerous fragments. Horace mentions the various kinds of poetry which Pindar cultivated in the following order (*Carm.*, iv. 2):—

Seu per audaces nova dithyrambos (the cyclic chorus)
Verba devolvit—
Seu Deos regesve canit Deorum
Sanguinem (the hymns).
Sive, quos Elea domum reducit
Palma cælestes (the Epinician odes).
Flebili sponsæ juvenemve raptum
Plorat (the dirges).

From which we may infer that Pindar was not regarded by the antients as pre-eminently or exclusively a composer of Epinician odes. On the contrary, it is likely that Pindar was quite as celebrated in other departments of lyric poetry; and from his education under Lasos, and his hereditary profession of a flute-player, it is not improbable that the dithyramb, which is placed first by Horace, was his favourite style of composition. We have still a very beautiful fragment of a dithyramb by Pindar; and if the others were like it, we may well regret the loss which we have sustained. As however all Pindar's extant odes (with the one exception just mentioned, of an ode composed for the installation of a Prytanis at Tenedos) were composed for the celebration of some victory in the public games, we must be content to form our judgment of his poetical power from these specimens, and in order to this we must bear in mind the very peculiar nature of the occasion for which they were composed, for it was this which gave the ode itself the particular character by which it was distinguished. An Epinician ode was the celebration of a victory gained at one of the public games, either by the speed of horses, by strength of body, by skill in gymnastic exercises, or by proficiency in music. Along with the victor's name the herald proclaimed that of his native city, which was considered to derive great renown from the achievement of its citizen. The games themselves being a religious institution, it is obvious that the celebration of the victory must also have had something of a religious character. It was in fact a mixture of the solemnities of religious worship with the joy and revelry of the feast, a mixture very common among the Greeks, whose sacrifices to the gods were often only a constituent part of the banquet. The victor either went in procession to the altar of the god of the games, as at Olympia, in the evening of the contest, accompanied by a *comus*, which sang the *καλλίνικος* of Archilochus, or an ode composed for the occasion by some other poet; or he celebrated his victory on his return to his native city by a procession to a temple, a sacrifice, a banquet, and a comus. The poet praised both the victor himself, and his native city: the victor was praised either for his wealth (*ὄλβος*), as in the case of the horse-race, for it was only the wealthy who could contend for this prize, as Pindar himself says; or for his valour (*ἀρετή*), if he had been exposed to any danger in the contest. The city of the victor is generally praised with some reference to the mythical legends of its early history. This mythical element always formed the chief part of Pindar's ode, and it is allowed to run into every sort of digression, not however at random, but with some fixed purpose, which we have generally no difficulty in determining. Although Pindar's Epinician odes were performed by a chorus, the poet is always considered to speak in his own person. He avails himself of this, to deliver advice to the victor whose praise he is singing; to defend himself against the calumnies of his enemies; to criticise and depreciate rival poets, such as Simonides and Bacchylides; and sometimes even to address the person whom he employed as his *χοροδιδάσκαλος* when his own absence prevented him from teaching the chorus. Thus in *Olymp.* vi., v. 88, he addresses the Stymphalian Æneas, who had been sent to receive the ode, and to instruct the chorus of his countrymen in the words and music of it:—'Urge your companions, Æneas, in the first place to sing the praises of Juno, and then let them know if we really escape the old calumny, '*Bœotian swine;*' for you are a correct messenger, the estafette of the fair-haired muses, a sweet mixing-cup of loudly-uttered minstrelsy.' He often makes boastful comparisons between himself and other poets, as when he says (*Ol.*, ii., 83):—'I have many swift arrows within my quiver; they have a voice for the wise; but for the common herd they need an interpreter: wise is he who has learned much by his natural abilities; but those two (Simonides and Bacchylides), whose expertness comes from practice only, babbling in their garrulity like a brace of jack-daws, clamour in vain against the god-like bird of Jove (i.e., himself).' The most striking feature in Pindar's poetry is its picturesqueness. He has great skill and power in description, and his style abounds in the most racy and vivid metaphors. From the festal nature of most of his odes, we find in them, not unfrequently, coarse jocularities which are repugnant to the spirit of modern lyric poetry, and which therefore offend the modern reader, who comes to the perusal of Pindar with vague expectations of that continued flow of sublime imagery and dignified but pompous diction which are generally considered essential to the lyrical poem. It should never be forgotten, that though the occasions for which Pindar wrote required much of solemnity and religious gravity, they admitted, at the same time, every variety of jocose merriment which such a joyful event might suggest. In a word, the Epinician odes of Pindar were performed by the comus as much as by the chorus; they were sung to the loud-booming flute as much as to the tranquil melodies of the harp; and the rhythms were Æolian, or Lydian, as often as Doric.

The best edition of Pindar is that by August. Böckh, Lipsiæ, 1811, 1821, 3 vols. 4to. The sound criticism which Böckh has applied to the text of the author, and his comprehensive and masterly explanations, have thrown an entirely new light upon the music, metres, lyric poetry, &c. of the Greeks. Ludolf Dissen, who wrote the explanations to the Nemean and Isthmian odes for Böckh's edition, subsequently (1830) published a smaller edition, which may be considered as an abridgment of Böckh's. As an explanatory edition it is a very good one; but as the fragments are not printed complete, it cannot be considered as a substitute for its predecessor. There is a very good translation of Pindar into English verse by the Rev. H. F. Cary (London, 1833), which would have been still better if the translator had taken Böckh and Dissen for his guide instead of Heyne. The translations by West and Moore are very inferior to Cary's, as representatives of the sense of the original, though there is much of taste and vigour in those of the latter author.

PINDEMO'NTE, IPPO'LITO, born at Verona, in 1753, was a younger son of a patrician family of Verona. His elder brother, Giovanni Pindemonte, wrote some tragedies, among others, 'I Baccanali,' which were much esteemed at the time. Ippolito studied at the college of Este, and afterwards at Modena. On completing his studies, he travelled through Europe, and visited France, Germany, Holland, and England, of which last country he speaks in his verses with affectionate remembrance. Being made a knight of the order of St. John, he went to Malta, where he resided some time, as well as in Sicily. When he was about thirty years of age, a serious illness, which showed the constitutional weakness of his frame, induced him to give up active life and retire to the country. He fixed his residence at Avesa near Verona, where he wrote his 'Prose e Poesie Campestri,' published first in 1785, and often reprinted since. The philosophy of his prose is of the contemplative kind, but it is warm-hearted and liberal. His poetry is beautifully harmonious and flowing. In his next production, 'Epistole in Versi,' he alludes to the revolutionary war then raging in Italy, and its fatal effects upon morals and social happiness. The catastrophe of Venice is especially deplored by him, as well as the devastation of his own native town, Verona, in 1797, and the plunder of the Italian works of art, which were carried to Paris. These passages from the pen of an upright independent man are instructive comments upon the true character of those times. Pindemonte afterwards published a volume of Sermoni, also in verse, being a kind of satires after the manner of Horace, in which he lashes, though in a good-humoured strain, the follies of his age. In one of these compositions, entitled 'I Viaggi,' he ridicules the affectation of his countrymen, who, after having visited France, England, or Germany, returned full of disdain for their native country, and were continually boasting the superiority of foreign manners, foreign luxuries, and even foreign vices. He then passes in review the foreign travellers who visit Italy, exhibiting their national peculiarities, their fault-finding with the inns, the roads, the carriages, the manners, society, everything in short, and regretting that they cannot find in the Italian cities the sprightly gaieties of Paris or the domestic comforts of England. He pourtrays the German, with his bulky album, writing his memoranda at every stage; the Spanish grandee, with his golden fleece hanging on his breast, visiting every church or convent on his way, pompous, listless, and taciturn; the Russian, priding himself on his French and his knowledge of the arts. In another Sermone, entitled 'Le Opinioni Politiche,' the author takes for his text Goldsmith's lines—

> 'In ev'ry government, though terrors reign,

'I also,' says Pindemonte, 'can distinguish between the civil institutions of various countries; I can discern the gold from the dross; I know the difference between England and Turkey; but what I blame is the exclusive importance attached by individuals to political opinions and political systems, as if man could not live and be happy, and make himself useful under every orderly form of government.' And in a later composition, 'Il Colpo di Martello,' he further explains his meaning in reply to some strictures of an Italian journalist: 'I never meant that the political institutions of a country do not affect the happiness of a nation; but what I said, and what I shall always repeat to foreigners as well as to my own countrymen, is, that in all countries, and under every climate, man must look for happiness within himself, and that institutions and forms of society may assist and increase his welfare and contentment, but cannot originate it.'

Pindemonte wrote a drama, 'Arminio,' in which he introduced the chorus, a novelty on the Italian stage. He published together with it, three dissertations, one on recitation, another on tragical poetry, and the third on the drama of Merope, a subject treated by both Voltaire and Maffei. These dissertations contain much sound criticism. He also published a translation of the 'Odyssey,' in Italian blank verse, which was well received. When Foscolo published his beautiful little poem the 'Sepolcri,' addressed to Pindemonte, the latter replied to it by another poem on the same subject, which is full of pathos, and at the same time of consolatory thoughts on man's immortality. The two poems are generally published together.

The last work of Pindemonte was his 'Elogi di Letterati,' a biographical work in prose, 2 vols. 8vo., 1825-6. Pindemonte's health had always been delicate, and in his latter years he suffered from depression of spirits, which the death of his early friends, and especially of Foscolo and Monti, seems to have increased. He died at Verona, in November, 1828, a month after the death of Monti. His unblemished character, his amiable disposition, and his great accomplishments, contributed as much as his writings to mark him as one of the most distinguished Italians of his age. A monument has been raised to his memory by his townsmen of Verona.

PINDUS. [GREECE.]

PINE-APPLE, the fruit of the *Ananassa sativa*, Lindl., a tropical plant, indigenous to South America and some of the West India Islands. It has become so perfectly naturalised in many parts of the hot regions of Asia and Africa, that it has been thought to be likewise a native of those countries. When the British troops invaded Burma, they found the woods around Rangoon abounding in wild pine-apples, and a variety from the back of the Black Pagoda was in great request for its excellence: in the Malay Archipelago it acquires an enormous size, and sports into a variety called *the double pine-apple*, each pip of its fruit growing into a branch bearing a new pine-apple. It was however first introduced into Europe from South America, and, as it is recorded by M. Le Cour of Leyden, about the middle of the seventeenth century: from Holland it was brought to this country in 1690, by the earl of Portland, according to the Sloanean MSS. in the British Museum. There is a painting, formerly in the collection of Horace Walpole, in which Charles II. is represented as being presented with the *first* pine-apple by Rose, his gardener; but there are some doubts whether that fruit was grown in England or obtained from Holland. It may however be fairly concluded that pine-apples were exceedingly rare in this country, even at the tables of the nobility, in the beginning of the last century; for in 1716, Lady Mary Wortley Montagu remarks that pine-apples were on the electoral table at Hanover when she was there in that year, on her journey to Constantinople; and she states that she had never previously seen that species of fruit. (*Letters of Lady M. W. Montagu.*) Since that period the cultivation of the pine-apple has been prosecuted with perseverance in Britain, but frequently the results have been very disproportionate to the expense incurred. Within the last twenty years however, success has been more general; and in many instances a surprising degree of perfection has been attained, much greater indeed in England than in any other country having to contend with an extra-tropical climate, for instances are on record of pine-apples weighing 13lbs. and 14lbs. avoirdupois, and from 7lbs. to 8lbs. is by no means an uncommon weight for a single fruit. At the present day the pine-apple in England is so abundantly produced, that although expensive, it is very common. Its delicious flavour, and the noble appearance which a well-grown fruit exhibits, render the cultivation of it a special object of horticultural enterprise and skill.

As, notwithstanding the many treatises that have been written on the subject, failures in the production of fine fruit continue to occur, it seems desirable to point out in what the mismanagement of a gardener is most likely to consist, and how he may apply the directions to be found in books of gardening with least chance of failure.

It has been already stated that this plant is an inhabitant of the tropics, and it may be added, near the level of the sea. The latter circumstance it is necessary to remark, because if it were a mountain plant, even though tropical, it might be natural for it to endure a comparatively low degree of temperature. But according to Beyrich (*Gardener's Magazine*, iii. 442), 'the pine-apple in its wild state is found near the sea-shore, the sand accumulated there in downs serving for its growth, as well as for that of most of the species of the same family. The place where the best pine-apples are cultivated is of a similar nature. In the sandy plains of Praya Velha and Praya Grande, formed by the receding of the sea, and in which no other plant will thrive, are the spots where the pine-apple grows best.' The temperature at the level of the sea at or near the equator varies but little throughout the year; for instance, the mean temperature of the warmest month at Cumana, 10° 27′ N. lat., is, according to Humboldt, 84·38°, and that of the coldest 79·16°. At Havanna, on the skirt of the tropics, the mean of the warmest month is 83·84°; that of the coldest 69·98°. At Vera Cruz the mean temperatures of the warmest and coldest months are respectively 81·86° and 71·06°.

In conformity with the above, and also from the results of experience, it may be stated that the artificial temperature of the atmosphere in which the pine-apple is intended to be grown should have a mean of about 80°; or a minimum not lower than 70° at any time of the year, and a maximum not higher than 90°. When, from the shortness of our days in winter, there is a deficiency of light, and when forcing the plant in its absence would produce only imperfectly formed tissue, 70° will be proper. In summer 80° to 85°, or in the case of fruiting plants, from that to 90° will not be too much. The maximum by sun-heat may extend higher, but 100° should be its limit.

With regard to bottom-heat, it should be in imitation of the heat of the tropical soil; and this varies even less than the temperature of a tropical atmosphere. The mean temperature of the earth is generally supposed to be somewhat higher than the mean of the atmosphere, owing to the greater capacity of the soil for retaining caloric. The discrepancy however cannot be great; and if the mean atmospheric temperature at the equator be from 80° to 84°, as has been ascertained from numerous observations, the temperature of the soil, it may be presumed, will not average lower; nor will it be many degrees higher where moisture sufficient for vegetation exists, as is generally the case in islands; although on continents it becomes so great as to reduce the soil to a desert. The temperature of the earth a foot below the surface, in New Granada, is 85° during summer, according to a correspondent of Mr. Hay (*Gard. Mag.*), and this degree of heat will be found a very good medium for the roots of the pine-apple. Bottom-heat then should never be allowed to fall below 75°, nor rise higher than 90°.

The soil for pine-apples requires to be rich. A fresh yellow loam, strong, but by no means of a binding nature, with which is mixed a quantity of cow-dung, will answer very well. The pots require to be well drained, and over the drainage some pieces of turf may be placed. Manure-water, made by steeping sheep's dung or cow-dung, is occasionally applied, care being taken that it be properly diluted. If the plants are found not to be thriving, they may be shifted, without hesitation, at any period of their growth.

It is very important that a perfect drainage be at all times maintained. When pots are plunged in tan, the worms are apt to close the holes in the bottom of the pots by their excretions; or a stoppage may occur in consequence of the pressure of the pot upon the tan when it wastes and becomes capable of being rendered compact. From whatever cause the defect proceeds, a good preventive may be easily effected by simply plunging an empty pot, with its *mouth downwards*, and on this placing the bottom of that containing the plant, closing the tan round the sides of the latter in the usual way. If at any time the tan should become too hot, it may be partially removed from the sides of the pot.

Moisture is essential for the growth of the pine-apple. The condition of the soil in the pots will of course indicate whether water should be applied or withheld. But in summer the atmosphere should be kept moist by syringing, particularly before shutting up at night. No water should on any account be used of a temperature many degrees lower than that of the soil in the pots where the plants are growing; it should not, in short, be applied lower than 75°, and 80° will prove a good medium. When the fruit is ripening off, moisture of course should be withheld; and in damp cloudy weather in winter, when it is an object to restrain rather than promote growth, they should be kept rather dry than otherwise. Moisture will not prove injurious when it is accompanied by a sufficiently high temperature and a due share of light. The mode of heating by means of hot-water pipes is undoubtedly the best for pine-stoves; and steam from the boiler should be at command, so that it may be introduced to the interior of the house as occasion requires.

Pine-apples may be grown under various modes of treatment. Instead of being confined in pots, they are sometimes planted in a bed of soil. This has been found to answer very well where good drainage was secured, and where a proper degree of bottom-heat could be applied. They have also been grown in pots placed on shelves or on sand; this mode however has not proved fully successful, for the roots are subjected to vicissitudes consequent not only upon the variations in the temperature of the atmosphere of the house, but also its hygrometrical conditions.

A principal cause of failure in the cultivation of the pine-apple appears to have arisen from the idea that the plants will bear a much lower degree of temperature than that above pointed out as being natural to them. They will *apparently* do so; but although the plants may continue to have a healthy appearance, yet experience proves that their vital energy is interfered with, and their powers of organization diminished, as is continually indicated by the fruit-stem being sent up with only a few imperfect pips. The stagnation of water about the roots from defect of drainage, too much heat and moisture, or too much heat and dryness, or checking the plants by cold in order to bring them to a fruiting condition, instead of forwarding them naturally to that state, are other sources of failure on the part of cultivators. With regard to the last, the only method that ought to be taken to bring on the time of fruiting is to inspissate the sap, and to augment the amount of secretions by gradually withholding moisture and increasing the temperature, at the same time admitting a little more air than usual; and after this, by the sudden application of a brisk temperature with more moisture.

To richly manured soil the large size of the pine-apples produced in England may be attributed; and to the means that cultivation under glass affords of progressively inspissating the juices towards the period of ripening, may be ascribed the superiority of the fruit to that produced in countries where the plants are indigenous, as was alluded to under Ananassa sativa.

The varieties of the pine-apple are numerous; the best however have been already enumerated [Fruits]; and full descriptions of upwards of fifty varieties may be referred to in the *Trans. Hort. Soc. of London*, 2nd series, vol. i.; and of all the principal varieties in the *Guide to the Orchard and Kitchen-Garden*.

PINE TREE. [Pinus.]

PINEAL GLAND. [Brain.]

PINE'DA, JUAN DE, born at Seville, in 1557, entered the order of St. Francis, and not of the Jesuits, as stated in the 'Biographie Universelle.' He acquired a great reputation for general erudition, especially in the Greek, Hebrew, and Oriental languages. On being appointed counsellor to the court of the Inquisition, he was commissioned to visit the principal libraries of Spain, in order to register those works which might be obnoxious to the Roman Catholic religion. The result of his inquiry was an 'Index novus Librorum Prohibitorum,' Seville, 1631, published by order of Cardinal Zapata, grand-inquisitor of Spain. Pineda published a version of Theodore Peltar's 'Catena Græcorum Patrum in Proverbia Salomonis.' He also published — 1, 'Commentarius in Job,' 2 vols. fol., Madrid, 1597; 2, 'Salomo Prævius, sive de Rebus Salomonis Regis,' libri octo, Lyon, 1609; 3, 'Commentarius in Ecclesiasten,' Antwerp, 1620; 4, 'Monarchia Ecclesiastica, o Historia Universal del Mundo desde su Creacion hasta estos Tiempos,' 5 vols. fol., Barcelona, 1620. This work is a universal history of the world in 30 books, and is written with some display of erudition but no discrimination, and with all the intolerant spirit of an inquisitor. It seems that the Spaniards had no universal history in their language, and Pineda undertook to supply the deficiency.

PINERO'LO. [Pignerol.]

PINGRE', ALEXANDER WILLIAM, was born at

Paris, 4th of September, 1711, and educated in a religious establishment at Senlis. At the age of twenty-four he was appointed professor of theology, but during the persecution of the Jansenists he was deprived of his situation by the government, for some years after which he gained a livelihood by teaching the elements of grammar in an obscure college. Disgusted with his theological career, at the age of thirty-eight years or thereabouts, he began the study of astronomy, and his friend Lecat, a celebrated physician of his day, having shortly afterwards founded an academy at Rouen, the department of astronomy in that establishment was placed under Pingré's direction. His observation of the transit of Mercury, on the 6th of May, 1753, led to his being nominated a correspondent of the Academy of Sciences, of which, in 1756, he was elected a free associate. About this time also he was appointed chancellor of the university of Paris, and librarian of the abbey of Sainte Geneviève, on the summit of which building a small observatory was erected for his use. In connection with Lemonnier he computed a nautical almanac, called the 'Etat du Ciel,' for the the years 1754-7. In this work his chief object was to render an essential service to the mariner by supplying the means of determining a ship's longitude, which he proposed to deduce from the moon's hour angle by the aid of tables computed by himself with very great labour. The method however inspired little confidence, and was shortly afterwards superseded by one suggested by Lacaille, and now in general use, in which the longitude is deduced from the observed distance of the moon from a known star or planet.

In 1760 Pingré, by order of the government, sailed for the island of Rodrigo, in the Indian sea, in order to observe the transit of Venus, which took place on the 6th of June of the ensuing year. The ultimate object was the determination of the sun's parallax, which Pingré, from his own observations, inferred to be about 10″, but in later years his calculation was found erroneous. The same phenomenon was observed by him at the island of St. Domingo in 1769, during one of four voyages undertaken by him to try the chronometers of Berthaud and Leroy.

He died at Paris, 1st of May, 1796. The memoirs contributed by him to the Transactions of the Academy of Sciences consist chiefly of accounts of his observations, and will be found between the years 1753 and 1770. Of his published works the only one to which the least interest is now attached is his 'Cométographie, or an Historical and Theoretical Treatise on Comets,' Paris, 1783, 2 vols. 4to. Besides a very complete account of all that was then known concerning the nature and motions of comets, it contains the elements of no less than eighty orbits computed by himself. The readiness with which he engaged in the most lengthy numerical calculations appears to have been the most prominent point in his character. Lacaille had computed, for the 'Art de vérifier les Dates,' a table of the eclipses visible in Europe during the first eighteen centuries of the Christian æra. Pingré, without any obvious motive, repeated the whole of the working, adding however a list of the eclipses during the ten centuries preceding. He had also reduced a very large number of observations of different astronomers, beginning with Tycho Brahé, for a work which he intended to call the 'History of Astronomy during the Seventeenth Century.' Several sheets of the work were printed, when further progress was suspended by the depreciation of the assignats, and the publication has not since been, nor is it likely to be, resumed.

(Delambre, *Biographie Univ.*; *Mémoires of the French Institute*, 1790; *Notice of Pingré*, by M..Prony.)

PINIC ACID. This acid is obtained, according to Unverdorben, by digesting colophony, or common rosin, in cold alcohol of specific gravity 0·833. The solution obtained is to be mixed with one of acetate of copper in alcohol, and there is then precipitated a combination of oxide of copper with pinic acid; this salt, after washing with alcohol and digestion in a mixture of alcohol and hydrochloric acid, yields a solution from which water throws down pinic acid. The pinates of ammonia, potash, and soda are soluble in water, but those of other bases are mostly insoluble in it; they are generally dissolved by æther, but not by alcohol. When pinic acid is washed and boiled in water, it forms on cooling a hard brittle substance, which becomes brown by fusing, and passes into what Unverdorben calls colophonic acid.

PINITE, a mineral which occurs in imbedded crystals. Primary form a rhomboid, but generally found in hexagonal prisms. Cleavage parallel to the lateral faces of the prism. Fracture indistinct, uneven. Hardness, scratches gypsum, is scratched by fluor spar. Colour reddish, greyish, and greyish-red. Lustre slightly resinous. Opaque. Specific gravity 2·78 to 2·98.

Before the blow-pipe on charcoal it whitens, fuses on the edges, and yields a white glass with bubbles; with borax it fuses with difficulty into a transparent glass, coloured by iron. The Saxon variety is infusible.

It is found in Saxony, France, England, in some other parts of Europe, and in North America.

According to Gmelin, the pinite of St. Pardoux in France consists of—silica, 55·964; alumina, 25·480; potash, 7·894; soda, 0·386; peroxide of iron, 5·512; magnesia with manganese, 3·760; water with animal matter, 1·410: total, 100·406

PINK. [CARNATION.]

PINKERTON, JOHN, was born at Edinburgh in 1758, and was the third and youngest son of James Pinkerton. After finishing his school education, he was articled to a writer to the signet, in whose office he spent five years; but it does not appear that he ever engaged in the practice of that or any other profession. He commenced author in 1776, by the publication of an elegy entitled 'Craigmillar Castle;' and on the death of his father in 1780 he came to London, and settling there gave himself up to a literary life. In 1781 he published an octavo volume of poetical pieces under the title of 'Rimes,' which reached a second edition; and this was followed the same year by the first edition of a less forgotten publication, an octavo volume entitled 'Scotish Tragic Ballads,' a second edition of which appeared in 1783, accompanied with a second part containing 'Ballads of the Comic Kind,' the whole being now included under the general title of 'Select Scotish Ballads.' Of these pretended antient ballads however a considerable number were fabrications of Pinkerton's own. Meanwhile in 1782 he had published 'Two Dithyrambic Odes on Enthusiasm and Laughter,' in a sixpenny quarto pamphlet, and soon after another original volume of the same form, entitled 'Tales in Verse.' In 1784 he produced his 'Essay on Medals,' in 2 vols. 8vo., a work of considerable merit for the time, though now of little use, but in which Pinkerton is stated to have been much indebted to the assistance of the late Mr. Douce and another friend. It has been twice reprinted since with improvements. In 1785 he gave to the world, under the *nom de guerre* of Robert Heron, an octavo volume of 'Letters on Literature,' in which some singular opinions on the value of the Greek and Roman writers were attempted to be made still more startling by a new and very strange system of spelling, in which however the inventor had the good sense not to persevere after it had answered its temporary purpose. This book procured Pinkerton the acquaintance of Horace Walpole, and through him of Gibbon and other distinguished literary characters. His next publication was one which has retained its interest and value, his 'Antient Scotish Poems, never before in print, from the MS. collections of Sir Richard Maitland of Lethington, Knight,' 2 vols. 8vo., London, 1786. It is a mistake to describe this work as a literary forgery, as has sometimes been done; the poems from the Maitland and Bannatyne MSS., of which it consists, are all genuine. [MAITLAND, SIR RICHARD.] It is here however, in a 'List of all the Scotish Poets, with brief Remarks,' that he makes his confession of the forgery of several pieces in the previous collection. When he prepared that former work, he says, he was only eighteen (for it remained five years in MS., it seems, before it was published): 'as for his secret,' he continues, 'he has observed the Horatian precept he at first laid down to himself, *nonum prematur in annum*; and requests pardon both of his friends and the public for keeping it to himself. The fiction, as the publisher can inform, could not possibly have any sordid view, as the MS. was presented to him, and one half of the future profits, which was offered, was refused. For the imposition, it was only meant to give pleasure to the public; and no vanity could be served where the name was unknown. As to the vanity or pleasure of imposing on others, if there be such ideas, they are quite unknown to the editor. Perhaps, like a very young man, as he was, he had pushed one or two points of the deception a little too far; but he always thought that novel and poetry had no bounds of fiction.' What has been called the cool impudence of this ingenuous avowal has perhaps called forth more indignation than it deserves from some of the many quarters where Pinkerton has made himself an object of aversion by certain peculiarities of his writings and character.

In 1787, besides a compilation in 2 vols. 12mo., entitled 'The Treasury of Wit,' which he published under the name of Bennet, he produced the first edition of his 'Dissertation on the Origin and Progress of the Scythians or Goths,' 8vo., a work which, whatever may be thought of some of the conclusions at which he arrives, is full both of ingenuity and of various and accurate learning, and must be admitted to be a most creditable performance for a young man under thirty. Here he first announced that strong anti-Celtic feeling which colours all his historical and antiquarian disquisitions, and which made him so many enemies. This publication was followed in 1789 by a collection of 'Lives of Scottish Saints,' in Latin, 8vo.; an edition of Barbour's poem of 'The Bruce,' 3 vols. 8vo.; and by one of his most important works, 'An Enquiry into the History of Scotland, preceding the reign of Malcolm III.,' 2 vols. 8vo. (with the Dissertation on the Goths appended). This inquiry (which was reprinted, along with the Dissertation, in 1794, and again in 1814), with all the perversity or want of judgment on some points by which it may be thought to be disfigured, is still one of the ablest and most valuable works we possess on the subjects to which it relates, and would be indispensable to the student of Scottish antiquities, were it only for the many curious documents it contains, all rare, and some of them nowhere else to be found in a printed form. It was succeeded by 'The Medallic History of England, to the Revolution,' 4to., 1790; 'Scotish Poems,' reprinted from scarce editions, 3 vols. 8vo., 1792; 'Iconographia Scotica, or Portraits of Illustrious Persons of Scotland, with Biographical Notes,' 2 vols. 8vo., 1795-1797; and 'The History of Scotland, from the Accession of the House of Stuart to that of Mary,' 2 vols. 4to., 1797, another work of original research and great importance, although most repulsively written, from an unfortunate fancy of imitating Gibbon which had taken possession of the author, to the destruction of his own natural style, which, if not in other respects very happy, was at least plain and unaffected, and occasionally not without considerable vigour and liveliness. Prefixed to this work is a portrait of the author, with spectacles on, and surrounded by his books, with an inscription which takes care to inform us that he was as yet only in his thirty-eighth year. And he was certainly entitled to take to himself the credit of a most respectable amount of literary performance for that age. After the death of his friend the Earl of Orford, in 1797, Pinkerton communicated notes of his conversation in a series of papers to the 'Monthly Magazine,' which he afterwards collected and published along with a memoir of Walpole, in 2 vols. 12mo., under the title of 'Walpoliana.' His next publication was 'The Scottish Gallery, or Portraits of Eminent Persons of Scotland, with their Characters,' 8vo., 1799. In 1802 appeared the first edition of his 'Modern Geography, digested on a new plan,' in 2 vols. 4to., a second edition of which, extending to 3 vols., was brought out in 1807. There is also an abridgement of this work, in 1 vol. 8vo. In 1802 Pinkerton left England, and for the rest of his life resided chiefly in Paris, continuing however to give occupation to the press of his native country with his usual industry. Two thick but not very well filled octavos, entitled 'Recollections of Paris in the Years 1802-3-4-5,' which he published at London in 1806, exposed him to much ridicule by the Frenchified style of thinking and air of *petit-maitreship* affected by the quondam laborious antiquary. Returning however to his proper beat, he commenced in 1808 his great 'General Collection of Voyages and Travels,' which was completed in 16 vols. 4to., in 1813. This was accompanied by a 'New Modern Atlas,' published in parts, which was begun in 1809 and finished in 1815; and while occupied with these compilations he also found time to write his 'Petralogy, or a Treatise on Rocks,' which appeared in 2 vols. 8vo., in 1811, and was his last original work. He died at Paris, on the 10th of March, 1826, leaving a widow, a sister of Dr. Burgess, the late bishop of Salisbury, from whom however he had been separated for many years. The above detail of his literary labours is evidence sufficient that Pinkerton was no ordinary man; and his best performances, such as his Dissertation, his Enquiry, his History, and his edition of the Maitland Poems, with all their faults, not only all overflow with curious learning and research, but bear upon them the impression of a vigorous, an ingenious, and even an original mind. His violence and dogmatism, his arrogance and self-conceit, his pugnacity and contempt for all who dissented from his views, and above all his shallow and petulant attacks upon the common creed in religion and morals, have raised a general prejudice against Pinkerton, which has prevented justice being done to his acquirements and talents, and the real value of much that he has written. Two octavo volumes of his correspondence were published in 1830, the contents of which however are not of much interest.

PINNA MARI'NA. [MYTILIDÆ, vol. xvi., p. 50.]

PINNOTHE'RES. [PINNOTHERIANS.]

PINNOTHE'RIANS, a tribe of the third family of the *Brachyurous Crustaceans* (*Catametopes*), according to the arrangement of M. Milne Edwards.

The *Pinnotherians* are small crustaceans whose *carapace* is nearly circular, and whose teguments exhibit considerable softness. Their *eyes* are in general very small, and the disposition of their *front* and their *antennæ* varies, as also their *external jaw-feet*, which present remarkable anomalies. Their *feet* are short or of moderate length, and are in general very weak. The *abdomen* of the male is much narrower at its base than the corresponding part of the sternal plastron.

But it is the singular habits of these crustaceans which especially demand attention; for they ordinarily are housed between the mantle-lobes of certain conchifers—*Mytilus*, *Pinna*, *Mactra*, &c., for example.

M. Milne Edwards arranges in this small group the genera *Pinnotheres*, *Doto*, *Mictyris*, *Hymenosoma*, and *Elamena*; but he acknowledges that this tribe is not so natural as might be desired, and that hereafter perhaps the necessity for subdividing it may arise.

Pinnotheres. (Latreille.)

Generic Character.—*Body* circular and rounded above; front not soldered to the epistome; *eyes* very small, *orbits* nearly circular; internal antennæ of the ordinary form, and the fossets which lodge them scarcely separated from each other; *external antennæ* short, occupying the internal angle of the orbit. *Buccal* frame very wide backwards, and describing a semicircle forwards. *External jaw-feet* placed very obliquely; their enlarged and valvular portion is formed entirely by their third joint, which is very large, whilst the second is rudimentary; the fourth joint is inserted at the summit of the preceding, and the fifth, which is tolerably developed, is articulated with the sixth by the middle of its internal border, so that it is placed nearly like the thumb of the didactylous claws. The *sternal plastron* is very wide, and, in the male, the apertures of the organs of generation occupy its last segment. The *feet* are moderate. The *abdomen* of the male is small, whilst that of the female is ordinarily very convex, and much larger than the sternal plastron. (Milne Edwards.)

View of the under side of the upper part of Pinnotheres, eyes, jaw-feet, &c seen from below and magnified. (M. Edwards.)

Before we lay before our readers examples of this curious crustacean, it is necessary to refer them to Mr. Thompson's interesting 'Memoir on the Metamorphoses and Natural History of the Pea Crab' (*Entom. Mag.*, No. xi.), whence it appears that *Pinnotheres*, in the early stages of its existence, has a very elongated abdomen which is terminated by a fin, the carapace armed with three spiniform prolongations, very large eyes and natatory feet; in short that it then bears the greatest resemblance to *Zoea*.

These curious animals were known to the antients, who were not ignorant of their connexion with the *Pinnæ*. The Greeks named them Πιννοτῆρας (Pinnoteres) and Πιννοφύλαξ (Pinnophylax). (Arist., *Hist. Anim.*, v., xv.) Oppian (*Halieut.*, ii., line 186, et seq.) treats the connexion as a sort of partnership for obtaining prey. The *Pinnoteres* of Pliny (*Nat. Hist.*, ix., xxxi.) described as harbouring in the empty shells of oysters, and as migrating to others when it increased in growth, appears to have been more applicable to the *Pagurus* of the moderns; but the same author, in the forty-second chapter of the same book, 'De Pinna, et Pinnotere, et aquatilium sensu,' uses the terms *Pinnoteres* and *Pinnophylax* to designate the crab which resides in the shell of the *Pinna*.

Among the moderns Hasselquist has given one of the best accounts of the habits of the genus. In a letter to Linnæus, dated 'Smyrna, December 16, 1749,' he says, 'The time I have been here has afforded me an opportunity of seeing the kinds of fish and shell-fish the Greeks use in their Lent. I believe no people make so much use of shell-fish and other sea animals as the Greeks do. I have seen them eat ten different sorts of shell-fish (crabs, prawns, and shrimps are not included, being ranked by Linnæus under the class of insects), when with us oysters only are eaten. Amongst others they sell here a *Sepia* (Cuttle-fish), which by them is called ὀκτωπόδια; it has only eight tentacula, all of equal length; the whole animal is a foot long, and thick in proportion. Of this the Greeks have related to me an anecdote, which I think remarkable. The *Pinna muricata*, or great Silk muscle, is here found in the bottom of the sea in large quantities, being a foot long. The ὀκτρωπόδια, or cuttle-fish with eight arms, watches the opportunity, when the muscle opens her shell, to creep in it and devour her; but a little crab, which has scarcely any shell, or has at least only a very thin one, lodges constantly in this shell-fish; she pays a good rent by saving the life of her landlady, for she keeps a constant look out through the aperture of the shell, and on seeing the enemy approach, she begins to stir, when the πίνα (for so the Greeks call the shell) shuts up her house, and the rapacious animal is excluded. I saw this shell-fish first at the island of Milo, and found such a little crab in all I opened: I wondered not a little what was her business there; but when I came here, I was first informed of it by the secretary of our consul, Mr. Justi, a curious and ingenious man, who has travelled much, and lived long in this place. This was afterwards confirmed by several Greeks, who daily catch and eat both these animals.'

M. Milne Edwards remarks that the distinction of the species of this genus is difficult, inasmuch as that the principal differences to be remarked in the greater part of them do not exist in both sexes, and are often of the nature of those which are modified by age.

We select as examples *Pinnotheres Pisum, the Pea-crab*, and *Pinnotheres veterum*, *Pinnotheres* of the antients.

Description of *Pinnotheres Pisum.*

Carapace soft; front projecting in the male, not reaching beyond the curved line formed by the anterior part of the carapace in the female. Inferior border of the hands ciliated. Abdomen of the female circular; that of the male having the last joint less than the penultimate. Length: *female*, 4 lines; *male*, 2 lines.

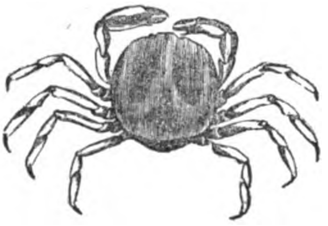
Locality.—Very common in *Mytilus edulis* on the coasts of England and France. [Leach, *Malac. Brit.*, t. 14, f. 2, 3 (female); *P. varians* of the same work, t. 14, f. 10 and 11 (male); *P. Latreillii* of the same work, t. 14, f. 7 and 8 (young female).] (M. Edwards.)

M. Milne Edwards is of opinion that *Pinnotheres Cranchii*, Leach (*Malac.*, t. 14, f. 4, 5), does not differ specifically from *Pinnotheres Pisum.*

Description of *Pinnotheres veterum.*

General form the same as in the preceding species. A small spine on the lower border of the right *manus* in the female. The abdomen of the female is oval; but this particularity may disappear with age. Length of the female, 8 lines.

Locality.—Found in *Pinnæ* on the coasts of Italy, &c.



Pinnotheres veterum.

Elamena. (M. Edwards.)

Founded on *Hymenosoma Mathæi*, figured by M. Rüppell, in his work on the 'Crustacea of the Red Sea,' and separated from that genus by M. Milne Edwards, who thinks that it seems to establish the passage between the *Hymenosomata*, the *Oxystomes*, and the *Oxyrhynchs.*

Carapace nearly triangular, plain above, and extremely flattened. The whole body nearly lamellar. *Front* large, very much advanced, and assuming the form of a small lamellar nearly-horizontal rostrum, below which the eyes are hidden; these last organs are of moderate size and not lodged in orbitary cavities; they are free under the front and are applied backwards against a small projection of the pterygostomian region. The *internal antennæ* are separated from each other by a small vertical plate of the lower surface of the front; their basilary joint is very small, and their moveable stem bends back longitudinally, and thus reaches beyond the ocular peduncles. The *external antennæ* are very small, and cylindrical from their base; they spring below the ocular peduncles, and do not reach the edge of the front. The *epistome*, instead of being hardly distinct, as in the *Hymenosomata*, is very large and nearly square. The *buccal frame* is small, quadrilateral, and entirely occupied by the *external jaw-feet*, whose third joint is nearly square, and is truncated at its anterior and internal angle, for the insertion of the succeeding joint, which is completely exposed. The *sternal plastron* is much wider than it is long. The feet are all slender, filiform, and long; those of the first pair are terminated by pincers, which are convex at the end and hollowed out into a spoon-shape; the succeeding feet end in a lamellar and slightly falciform joint. The abdomen of the female is very large. (M. Edwards.)

M. Milne Edwards is of opinion that this crustacean is nearly allied to the *Inachoïdeans*, and ought probably to be approximated to them; but not having had an opportunity of examining a male individual, and being consequently ignorant of the disposition of the male intromittent organs, he has preferred leaving it provisionally next to the *Hymenosomata*, of which it has hitherto formed a part.

Example, *Elamena Mathæi* (Rüppell, *Krabben*, pl. v., f. 1).

Description.—Carapace smooth, very wide behind, rounded on the sides, and gradually narrowed up to the rostrum, which is a little elevated; its edges furnished with a kind of horizontal crest, which is extremely delicate, and irregularly cut off as it were. Second pair of feet longest, being nearly thrice the length of the carapace. Length four lines.

Localities.—The Isle of France and the Red Sea.

Hymenosoma. (Leach.)

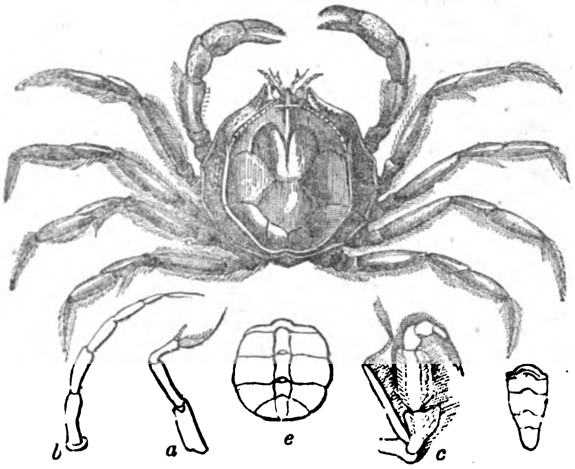
Generic Character.—*Carapace* very much flattened above, and nearly circular; the *front* very narrow and inclined. *Orbits* very small, and nearly circular, and the eyes must be bent back downwards rather than outwards to be hidden in them. The *antennary fossets* are longitudinal, and continued without interruption with the orbits; the stem of the *internal antennæ* is large. The *external antennæ* are inserted near the external angle of the orbit, and are more elongated than in the greater part of the *Brachyura*. The epistome is hardly distinct, and is hidden by the *jaw-feet*. The *buccal frame* has the form of a long square; its lateral borders are very projecting, and terminate at the exterior angle of the orbits. The *external jaw-feet* are long and narrow; their third joint is much longer than the second, and carries the succeeding joint at its anterior extremity. The *sternal plastron* is circular. The *anterior feet* are moderate, and the third pair are the longest; the tarsi are slender and styliform. The abdomen of the male is very small, only reaching to the level of the third pair of feet. (M. Edwards.)

M. Milne Edwards remarks that hitherto this genus has been arranged in the neighbourhood of the *Inachi*, principally on account of its narrow and pointed front; but its natural position appears to him to be in the family of the *Catametopes*, for it is to this type that it approaches in all the important points of its organization. Moreover, as in the greater part of the crustaceans, the abdomen of the male is much narrower than the posterior border of the sternal plastron, and the apertures of the generative apparatus are formed in that buckler, instead of being situated, as ordinarily, on the basilary joint of the posterior feet.

Example, *Hymenosoma orbiculare.*

Description.—Carapace marked above with a large circular and smooth impression; slightly granular on the sides. Two spiniform teeth on each side of the epistome, one formed by the anterior extremity of the lateral border of the buccal frame, the other by the external orbitary angle. Tarsi very much elongated. Length one inch.

Locality.—The Cape of Good Hope.



Hymenosoma orbiculare.

a, internal antenna; *b*, external antenna; *c*, right external jaw foot; *d*, abdomen of the male; *e*, abdomen of the female.

Mycteris. (Latreille.)

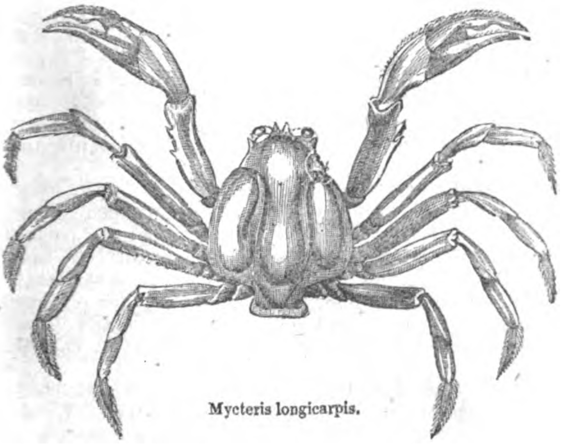
Generic Character.—Carapace extremely delicate, nearly circular, and very convex above. *Front* disposed nearly as in the *Ocypodes* [Ocypodians]; but the eyes, which are short and stout, have no orbitary cavity for concealment, and always remain projecting. The *internal antennæ* are very small, and placed as in the *Ocypodes;* the *external antennæ* are the longest. The disposition of the *mouth* is very remarkable. The external jaw-feet, instead of applying themselves horizontally to the buccal frame, remain nearly vertical, and form by their union a short and wide reversed cone, whose summit, directed downwards, is open and furnished with hairs; their lamellar portion (formed by the second and third joint) is very wide, and carries the succeeding joint at its anterior extremity; in front of the apophysis, situated at the base of these jaw-feet, and directed below for the support of the flagrum, the carapace presents a great notch, so that the afferent aperture of the respiratory apparatus is always gaping. The first pair of feet are very long, and are folded longitudinally upon the mouth; the succeeding feet are long, slender, and flattened. The abdomen has the same form in both sexes, and is enlarged towards the end. (M. Edwards.)

M. Milne Edwards is of opinion that these singular crustaceans establish, in some respects, the passage between the *Ocypodes*, *Pinnotheres*, and even certain *Macrura*, such as *Callianassa.* [Callianassa.]

Example, *Mycteris longicarpis.*

Description.—Carapace smooth and divided by furrows into three longitudinal portions; a small spine at the spot where the external orbitary angle is ordinarily found; anterior border of the carapace very much projecting, and furnished with hairs. Arms curved, and armed below with spiniform teeth; carpus very large; fingers long and curved. Length about one inch.

Locality.—Australasia.



Mycteris longicarpis.

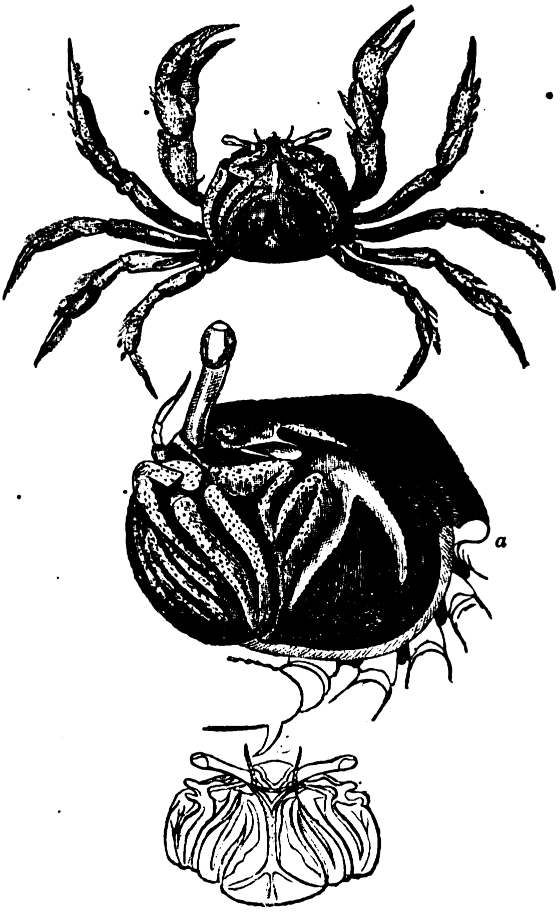
Doto. (M. Edwards.)

M. Milne Edwards remarks that he here places, not without doubt, a small and very remarkable crustacean which Savigny has figured in the great work on Egypt, and which M. Audouin has referred to the genus *Mycteris.* It approximates to the *Ocypodes* much in the general form of the body, in that of the feet, and in the disposition of the front, the antennæ, and the eyes; but it is distinguished from all the preceding *Catametopes* by the conformation of the *external jaw-feet* and the form of the *buccal frame.* This last is very wide behind, and narrow before; the third joint of the *external jaw-feet* is much larger than the second, and nearly entirely hides the succeeding feet, the first of which is inserted at its anterior and external angle. The palp, placed at the external side of these organs, bears a tolerable resemblance to that of the *Ocypodes*, for it does not carry at its extremity a multi-articulate filament, as is the case with the greater part of the *Brachyura.* M. Milne Edwards is of opinion that this crustacean establishes, by means of the organization of the buccal apparatus, the passage between the *Ocypodes* and the *Pinnotherians.*

Example, *Doto sulcatus* (*Cancer sulcatus*, Forsk.; *Mycteris sulcatus*, Audouin).

Description.— Carapace nearly square, and furrowed above; the front orbital border occupying nearly the whole of its width. Pterygostomian regions and external jaw-feet equally furrowed. Feet rather long and slightly compressed. Length about six lines.

Locality.—The Red Sea.



Doto sulcatus (enlarged).

a, profile view still more enlarged, without the legs, to show the grooves; *b*, detail of under part of carapace.

PINT, the half of a quart, and the eighth part of a Gallon, which is the standard measure connected with the pint.

PINTO, FERNAM MENDEZ, a celebrated Portuguese traveller, was born at Montemor-o-Velho, near Coimbra, of obscure parents, about 1510. He entered the service of a Portuguese gentleman, in which he continued eighteen months. An adventure, by which he had well nigh lost his life, but which he does not disclose, obliged him to emigrate, and he sailed in a vessel bound for the East Indies. Scarcely however had he lost sight of the coast of Portugal when the vessel was attacked and plundered by pirates, and Pinto was obliged to return to Lisbon, where he entered the service of Dom Francisco de Faria. Some time after, with the expectation of making his fortune, he embarked for India, and arrived at Diu in 1537, where he enlisted among the crew of a vessel designed to cruise against the Turks. He was captured at the entrance of the Red Sea, carried to Mocha, and there sold to a Greek renegado, and afterwards to a Jew, in whose possession he remained till he was redeemed by the Portuguese governor of Ormuz, who procured him the means of going to India. On his return to that country, Pinto met at Goa the captain-general of Malacca, Pedro de Faria, who took him into his service, and gave him the command of a small vessel employed in the trade with China. Having been attacked at the mouth of the river of Lugor by a Chinese pirate, who boarded and plundered his vessel, Pinto, though wounded, succeeded in making his escape, and arrived at Pattan, on the gulf of Siam.

Antonio de Faria (a brother of Pedro), on hearing the news of the loss of the vessel, swore he would have his revenge, and having enlisted a crew of Portuguese adventurers, and Pinto among them, he sailed from Pattan on the 19th of May, 1540. The Chinese pirate was overtaken, his vessel captured, and himself put to death. From this period Pinto's life seems to have been one of constant vicissitudes. He was one day the master of countless treasures, on the next groaning in captivity. In the intervals he was employed on a mission to Japan, and in other important transactions, which he fully describes in his work. He seems even to have entered at one time the Jesuit convent at Malacca, a circumstance which explains why the earliest account of his travels is found in the first collection of their letters, published in Italian, at Venice, in 1565, in letters written by him, and dated from the convent. He was present at the death of San Francisco Xavier; and Lucena, in his Life of that saint (*Historia da Vida do Padre Francisco Xavier*, Lisb., 1600), admits that he derived most of his information from papers procured from Pinto's widow. After twenty-one years' residence in various parts of the East Indies, China, Japan, Siam, &c., Pinto returned to his native country in 1558 (28th of September). He died at Almada, near Lisbon, but the year of his death is not known. The history of his travels and adventures was written for the amusement of his children. It abounds in gross exaggeration, and although there can be no doubt that Pinto visited the countries which he describes, it is also an ascertained fact that most of his descriptions are altogether imaginary, and that whatever curious and important matter is contained in his work is adulterated with idle and extravagant fictions. His expedition to the island of Calempluy, where, he tells us, 'he saw the tombs of the emperors of China,' and his route by land through part of the Chinese empire, are of this kind. Pinto's travels were not published until many years after his death, by Francisco de Andrade, Lisbon, 1614, in 4to., under the title of 'Peregrinaçam de Fernam Mendez Pinto,' &c. Six years after they were translated into Spanish by Francisco de Herrera, who added a prefatory discourse, intended to establish the authenticity of the narrative, Mad., 1620, fol. They were translated into French by Bernard Figuier (Paris, 1628 and 1645, in 4to., and 1830, 3 vols. 8vo.), and into English by H. Cogan (Lond., 1663, and 1692, in fol.). There are also editions of the original Portuguese work (Lisb., 1678, 1711, 1725, and 1762), with the 'Itinerario de Antonio Tenreiro.'

(Nicolas Antonio, *Bib. Nov.*, vol. ii., p. 380; Cardoso, *Agiologio Lusitano*, Lisb., 1652.)

PINTURI'CCHIO, BERNARDI'NO, born in 1454 at Perugia, was a disciple of Pietro Perugino, under whom he made great progress, and was often employed by his master as his assistant. He painted chiefly history, and also grotesque subjects, but he likewise excelled in portraits. Among his best portraits, peculiar praise is given to those of popes Pius II. and Innocent VIII., of Giulia Farnese, Cesare Borgia, and Queen Isabella of Spain. He executed numerous works at Rome and other cities of Italy: his manner was singular; he not only finished his paintings very highly, but endeavoured to give them unusual splendor, by introducing rich gilding blended with architectural ornaments, painted so as to resemble high relief, a style wholly incompatible with true taste and the simplicity and dignity of history. His most celebrated performance is the history of Pius II., painted in ten compartments, in the library of Siena, in which Raphael, then a very young man, and his fellow-student under Pietro Perugino, gave him some assistance.

The last work that he executed was a Nativity for the monastery of St. Francis at Siena, respecting which a story is told by Vasari and De Piles which seems eminently absurd and improbable. The monks, say they, assigned him a chamber where he might work undisturbed, from which, at his request, they removed the furniture, except a large old chest quite decayed by time. This too he insisted should be removed, in doing which it fell to pieces, and was found to contain 500 pieces of gold. This was a source of great joy to the monks, but the artist, say these writers, was so grieved that he had lost the treasure by his obstinately insisting on the removal of the chest, that he died of vexation a few months afterwards. How they ascertained that if he had suffered it to remain, he would have examined it and have stolen the treasure, they do not inform us. We suppose the artist himself did not say so. He died in 1413, aged 59. (Vasari; De Piles; Pilkington; Fuseli.)

PINUS, a genus of Gymnospermous Exogens, consisting for the most part of timber trees, inhabiting various temperate countries in the northern hemisphere. They are commonly called pine-trees, and are distinguished from the firs by their leaves, always evergreen, and needle-shaped, growing in pairs, threes, fours, or fives, surrounded by a membranous sheath at their base. In reality each parcel of leaves indicates a small branch axillary to a membranous, deciduous, withering leaf. The species are generally of great beauty as objects of ornament, or of much value on account of their timber, and are in much request by the planter: on which account we give a very brief enumeration of those species of which anything certain is known, the whole of which are actually in cultivation in Great Britain at this time.

Div. 1. *Scales of Cones truncate at apex.*

a. Leaves in pairs.

* *Scales of Cones spineless at apex.*

1. *The Scotch Pine* (Pinus sylvestris). Trunk erect. Leaves 2, short, glaucous. Cones ovate, stalked, and recurved, with rugged, truncated, depressed scales. This is the most hardy and valuable of all the pines. Its timber furnishes the red deal of the carpenters, and in Scotland, the climate of which country is particularly suited to it, the trees often acquire a great size, and highly picturesque appearance. It is however asserted that the quality of its timber is much deteriorated by being grown in warm districts. In England it is chiefly valued as a nurse to other trees, for which its hardiness and rapid growth render it well adapted. It forms an excellent screen in exposed sandy situations, where no other tree will thrive. Many varieties are known, of which an account will be found in Loudon's 'Arboretum Britannicum; of these the Pine of Haguenau, a village on the Rhine, is said to be the most important.

2. *The Dwarf Pine* (Pinus Pumilio). Trunk prostrate, dwarfish. Leaves 2, short, stiff, glaucous. Cones ovate, spreading, sessile, with depressed truncated scales. A small mountain species from the midland parts of Europe. Its timber is of no importance; in fact, from its small size, it can scarcely be said to yield any. It is probably an alpine form of *P. sylvestris*.

3. *The Hooked Pine* (P. uncinata). Trunk erect. Leaves 2, short, dark green. Cones oval, recurved, sessile, with pyramidal, recurved, truncated, or mucronated scales. A fine alpine tree, from the Pyrenees, and other European mountains, on the upper zone of vegetation, above P. sylvestris. It is extremely valuable for its hardiness and the great durability of its timber. The *P. Mughus* is apparently the same plant.

4. *The Red Pine* (Pinus resinosa). Trunk erect, lofty. Leaves 2, long, of a light somewhat glaucous green colour. Cones ovate-oblong, very obtuse, shorter than the leaves, pendulous, with rugged, rounded, truncated scales. A red-barked tree of large size from the northern parts of North America. The wood is fine-grained and of a close texture, and is highly esteemed in Canada for strength and durability. In appearance the species bear some resemblance to P Laricio.

5. *The Aleppo Pine* (Pinus halepensis). Trunk slender, erect. Leaves 2, long, slender, light green. Cones ovate, stalked, solitary, very regular in form, with depressed

truncated scales. A beautiful species, found wild in the western parts of Europe, from Genoa to Constantinople, and also throughout Syria. It grows fast, and is at once known by its fine light-green foliage; but its wood is not of much value, and it bears the climate of England with impatience.

6. *The Calabrian Pine* (Pinus Bruttia). Trunk erect. Leaves 2, slender, lax, pale green, very long. Cones sessile, in dense clusters, ovate, acute, very regular and even, with depressed truncated scales. A very handsome tree, inhabiting Calabria, and said to yield timber of excellent quality. It is very like the Aleppo Pine, but its cones are sessile and clustered, and it is much more hardy.

7. *The Banks Pine* (Pinus Banksiana). Trunk low, scrubby and straggling. Leaves 2, divaricating, oblique. Cones ovate, acuminate, horn-like, curved, erect, in pairs, grey, with rounded depressed truncated scales. An ugly tree, from the most southern parts of North America, where it is called the *scrub pine* and the *grey pine*. Its timber seems to be of little value, except for the construction of canoes, for which its lightness and toughness render it well adapted.

8. *The Pyrenean Pine* (Pinus Pyrenaica). Trunk erect. Leaves 2, long, fine, bright green, clustered at the end of the branches. Cones ovate, drooping, shorter than the leaves, with roundish truncated scales. A Spanish plant, inhabiting the Sierra de Segura, above the limits of the Aleppo Pine, on the Pyrenees, and elsewhere. Its timber is said to be of excellent quality and to have been used largely in the Spanish marine. It is reported to be a majestic species, and to be called by the Pyrenean peasants Pin Nazaron. It is the Pinus Hispanica of some collections.

9. *The Pallas Pine* (Pinus Pallasiana). Trunk erect, with horizontal branches when old. Leaves 2, dark green, very long, and stiff. Cones curved, horizontal, ovate oblong, as long as the leaves, with roundish truncated scales. A fine tree from the central parts of the Crimea, with the habits of the Pinaster. Wood resinous and durable, but difficult to form into good planks on account of being unusually knotty. The resin is stated to be very pleasant to the smell.

10. *The Stone Pine* (Pinus Pinea). Trunk erect; when old, flat-headed. Leaves 2, long, stiff, dark-green; when the plant is very young, small and glaucous. Cones roundish, polished, with rounded truncate scales. Seeds large, oblong, with a very short wing. An inhabitant of the southern parts of Europe and the Levant, where the wood is often used in ship-building, and the seeds, which are large and like nuts, are eaten. On the latter account it has accompanied Europeans in their migrations, and has now become common in many parts even of the southern hemisphere. The seeds are called pignons by the French. In Naples there is a variety with the shell of the seed thin and tender. The timber of this species is said to be whiter and rather more durable than that of the Pinaster.

11. *The Black Pine* (Pinus Austriaca). Trunk erect, with horizontal branches when old. Leaves 2, dark-green, glossy, straight, stiff, from three to five inches long. Cones conical, horizontal, shorter than the leaves, polished, and pale-brown. It is found among the rocks and precipices of southern Germany, and derives its name from the peculiarly dark colour of the foliage. The most sterile soil is said to suit it. The timber is reported to be valuable, but coarse; and to resist alternate dryness and moisture better than the larch.

12. *The Corsican Pine* (Pinus Laricio). Trunk very erect and tall. Leaves in pairs, long, deep green, distant, rather loose. Cones ovate, horizontal, shorter than the leaves, with roundish rugged truncated scales. A noble tree from the mountains of Corsica, Greece, Turkey, and Spain. It grows faster than any other known species, and produces excellent timber, similar in quality to red deal, but more brittle and less elastic. The French use it extensively in ship-building. The tree is now becoming common in this country.

** *Scales of Cones spiny at apex.*

13. *The Cluster Pine* (Pinus Pinaster). Trunk lofty, erect. Leaves 2, long, stiff, dark green. Cones clustered, recurved, conical, shorter than the leaves, with pyramidal scales terminated by a small rigid spine. A noble species, inhabiting the most sterile sandy plains of France and Southern Europe, especially along the coast. Its timber is soft, light, coarse, and only fit for very common purposes; but it affords a large quantity of resin and tar, and is much consumed in the manufacture of lampblack. It is this species that has been so successfully employed in fixing the loose drifting sand of the barren plains of some parts of France. An excellent account of it is given by Mr. Loudon, in his 'Arboretum Britannicum,' p. 2219. Many varieties are known, of which the most remarkable are, that called *P. Lemoniana*, with an irregular stunted zigzag habit, first observed upon the property of Sir Charles Lemon in Cornwall, and the *P. escarena*, a very vigourous variety introduced from Nice by the present earl of Aberdeen. *Pinus Massoniana*, a Chinese plant, is said to be the same as this.

14. *The Prickly Pine* (Pinus pungens). A large tree. Leaves 2, short, compact, pale green. Cones ovate, clustered, drooping, longer than the leaves, with hard pyramidal scales terminated by a stiff strong spine. A native of Virginia and North Carolina. The timber seems of no value. The aspect of the tree is something like that of the Scotch Pine, but it is paler. Its cones hang on the branches for many years. Mr. Loudon states that at Dropmore there are cones of more than twenty years of age still adhering to the trunk and larger branches.

15. *The Yellow Pine* (Pinus mitis). A fine tree. Leaves 2, long, slender, dark green. Cones ovate, pendulous, shorter than the leaves, with depressed roundish scales, armed with a small spine. Young shoots violet. A common inhabitant of the pine-forests of North America, as far north as Connecticut and Massachusetts. Its timber is of great value for domestic and naval architecture, provided the sap-wood, which is very perishable, is first removed. It is regarded as a most durable timber in this country.' In America it ranks next in quality to the P. Australis or *Southern Pine*. P. variabilis is one of its garden names.

16. *The Jersey Pine* (Pinus inops). A low gnarled tree. Leaves 2, dark green, from two to three inches long. Cones recurved, ovate-oblong, straight, longer than the leaves, with spiny spreading scales. Young shoots violet. A native of the more southern states of the American union. Its timber is of little use except for fuel. In this country it is usually a miserable-looking species, evidently unsuited to the climate. Like the Banks Pine, it is called Scrub Pine in the United States.

b. Leaves in threes.

* *Scales of Cones spineless at apex.*

17. *The Chinese Pine* (Pinus sinensis). A large tree. Leaves 3, slender, deep green, serrulated. Cones ovate, brownish, on short stalks, with flattened truncate unarmed scales. Native of China. Very little is known of it, except from Chinese drawings. It only exists in the garden of Mr. Wells, of Redleaf, near Tunbridge, where it is found to be 'tolerably hardy.' This seems to be the pine found on the Khoseea Hills of India, and regarded as a variety of Pinaster by Professor Royle.

18. *The Noble Pine* (Pinus insignis). Leaves 3, grass-green, a little wavy, irregularly arranged, longer than the cones. Cones ovate, bright brown, obtuse, with rounded depressed obtuse scales, the lowermost of which are longer than the others, and more or less hooked back. A beautiful species, native of California, remarkable for its bright dense grass-green foliage. Nothing is known of its native habit. It is rather too tender for the latitude of London.

19. *The Canary Pine* (Pinus canariensis). Trunk stout, erect. Leaves 3, very long, rough-edged, wavy, grass-green. Cones oblong, woody, five or six inches long, with prominent large pyramidal straight scales, terminated by a hard blunt callosity. A native of the mountains of Teneriffe and Canary, where it forms large forests, and often acquires an enormous size. The timber is said to be very resinous and durable. The species is too tender for England.

20. *The Ocote Pine* (Pinus Ocote or Teocote). Leaves 3, wavy, rough, light green. Cones obtuse at the base, ovate, smooth, with pyramidal angular blunt scales. A Mexican plant, of which little is known. It is found on M. Orizaba, and near Real del Monte, and forms a tree 100 feet high.

21. *The spreading-leaved Pine* (Pinus patula). Leaves 3, very slender, spreading. Cones ovate, oblong, polished, with small angular truncated prominent scales. Native of Mexico. A lofty tree, with leaves eight or nine inches long. It occurs in the northern provinces of Mexico.

* * *Scales of Cones spiny at the apex.*

22. *The southern Pine* (P. australis or P. palustris). Trunk erect, very cylindrical, and stiff. Leaves 3, very long,

grass-green, clustered at the ends of the branches. Cones ovate-oblong, seven or eight inches long, with depressed scales, armed in the middle with a small prickle. A native of Virginia and the neighbouring states of America to the south, where it acquires the height of from 60 to 70 feet, with a trunk from 15 to 18 inches in diameter for two-thirds of its length. Its timber is of excellent quality, light, clean, and durable, and is extensively employed in ship-building, particularly for masts. It also yields abundance of tar. It is unfortunate that this, the handsomest and the best of the North American pines, should be too tender for the climate of England.

23. *The Frankincense Pine* (Pinus Tæda). Trunk lofty, straight. Leaves 3, pale green, stout, straight. Cones curved, oblong, the length of the leaves, with compressed woody prominent scales, armed with a sharp point. A tree said to acquire the height of 80 feet, in the *barrens* of Florida and Virginia, but not much known in England, where it seldom thrives. There are however some fine specimens at Pain's Hill, and at other places near London. The timber is soft and perishable, but it yields a fragrant turpentine plentifully.

24. *The Pitch Pine* (Pinus rigida). Trunk lofty, straight, much branched. Leaves 3, of variable lengths. Cones clustered, sessile, ovate, with rugged compressed pyramidal scales, terminated by a small hooked spine. Found in poor soil in most parts of the United States, and even inhabiting salt-marshes overflowed by the sea. It has a thickish dark-coloured bark, and, in consequence of the number of its branches, has an unusually knotted structure. The wood yields tar in abundance, but is coarse-grained and of inferior quality. When growing in swamps, it has little or no heart-wood.

25. *The Pond Pine* (Pinus serotina). Trunk much branched. Leaves 3, very long (five or six inches). Cones roundish-ovate, in pairs, with prominent rounded scales, armed with a firm short brittle prickle. An obscure species, probably not distinct from the Pitch Pine. It forms a small tree, whose wood is of bad quality, and is found from New Jersey to Carolina in wet places, by the side of ponds, &c.

26. *The heavy-wooded Pine* (Pinus ponderosa). Trunk very rugged, and irregularly branched. Leaves 3, very long and strong. Cones small, oblong, with strong pyramidal scales terminated by a small recurved prickle. A large tree, with the habit of the Corsican pine. It was found in North-West America, by Douglas, and is a very rapid grower. The growth of the tree is however inelegant, and its timber, though heavy and durable, very coarse. In its native country it is infested with the Viscum Oxycedri, a parasitical plant.

27. *The Sabine Pine* (Pinus Sabiniana). Trunk straight, erect; the young shoots covered by a glaucous bloom. Leaves 3, very long and lax, glaucous, and serrated. Cones very large, roundish ovate, with large pyramidal hooked scales. A noble Californian tree, with a trunk from 110 to 140 feet high, and from 3 to 12 feet in diameter, clothed with branches to the ground, when standing far apart or solitary. The wood is white, soft, and not durable. The cones are often six inches in diameter, and are very hard, heavy, and woody.

28. *The Coulter Pine* (Pinus Coulteri). Trunk straight, erect; the young shoots covered with a glaucous bloom. Leaves 3, very long and stiff, glaucous, and serrated. Cones very large, oblong, with long wedge-shaped, rigid, woody, horned scales. A fine tree, from California, very like the Sabine Pine, and the two are perhaps too nearly related. The cones are however still larger and heavier than in that species, and more oblong, and the seeds are smaller. It is called P. macrocarpa in gardens.

29. *The long-leaved Pine* (Pinus longifolia). Trunk erect, with a coarse rugged bark, and whorled branches. Leaves very long, drooping, slender, bright green, channelled, and serrated. Cones shorter than the leaves, oblong-ovate, woody, and rugged, with pyramidal, obtuse, mucronate, corky, recurved scales. Seeds large, eatable. An Indian species, inhabiting the valley and lower hills of Nepaul. It is extremely beautiful, but too tender for the climate of England.

30. *The Neoza Pine* (Pinus Gerardiana). Trunk lofty, with a conical head. Leaves 3, short, stiff, glaucous, obsoletely serrated, with deciduous sheaths. Cones very like those of P. longifolia. Seeds large, eatable. A native of the coldest forests of the Himalayas, and chiefly occupying the dry bleak face of the Tartarian side of those mountains. It is represented to be a large tree, conical in form and compact in habit. The cones from 9 to 10 inches long. The Chilghoza Pine is thought to be the same thing.

c. Leaves in fives.

* *Scales of Cones spineless at apex.*

31. *The Egg-fruited Pine* (Pinus oocarpa). Leaves 5, slender, from 8 to 11 inches long. Cones roundish, ovate, polished, hard, with truncated scales. From the pine-region of Mexico, and also from the warmer valleys, forming a tree from 30 to 40 feet high.

32. *The Smooth-leaved Pine* (Pinus leiophylla). Leaves 5, very slender, 3 or 4 inches long, rough-edged, light green. Cones ovate, 2 inches long, on a short stalk, with truncate depressed scales, a little hollowed. An inhabitant of the cold regions of Mexico. Nothing is on record of its habit.

33. *The Montezuma Pine* (Pinus Montezumæ). Leaves 5, rather rigid, rough-edged, about 6 inches long. Cones ovate, oblong, bright brown, about as long as the leaves, with elevated, rugged, truncated scales. A native of the mountains of Mexico to the height of 11,000 feet above the sea.

34. *The Thread-leaved Pine* (Pinus filifolia). Leaves 5, from 12 to 15 inches long, acutely triangular. Cones sessile, ovate-acuminate, woody, hard, curved, 9 inches long, 3 inches in diameter at the base, with lozenge-shaped pyramidal depressed scales, and a hard woody compressed callous mucro in the middle. A noble pine, found in Guatemala by Mr. Hartweg. Nothing is yet known of its habits or timber.

35. *The Acapulco Pine* (Pinus Acapulcensis). Leaves 5, thin, short, very glaucous, as well as the shoots. Cones pendulous, ovate, acute, whorled, with pyramidal erect tapering scales, often contracted in the middle. Leaves about 6 inches long. Cones closely covered with pyramidal elevations, about 4 inches long. Found in Mexico, in ravines near Acapulco, growing 50 feet high.

36. *The False Weymouth Pine* (Pinus Pseudostrobus) Leaves 5, very fine, and glaucous. Cones ovate, whorled, horizontal, about 4 inches long, by an inch and a half in breadth over the middle, with pyramidal erect scales. A Mexican pine, with the habit but not the cones of a Weymouth pine, found very commonly at Anganguco, about 8000 feet above the sea.

37. *The Bedford Pine* (Pinus Russelliana). Leaves 5, very long. Cones tapering, horizontal, a little drooping, nearly straight, from 7 to 8 inches long, about 2 inches wide near the base, and almost acute at the upper end, with pyramidal straight obtuse scales. Native of Mexico near Real del Monte.

38. *The Devonshire Pine* (Pinus Devoniana). Leaves 5, very long. Cones pendulous, solitary, horn-shaped, from 9 to 10 inches long, about 3 inches in diameter near the base, and tapering to 1¾ inches, with rounded, obtuse, polished scales. A species called in Mexico *Pino blanco* or *P. real*, forming a large tree 60 or 80 feet high, between Real del Monte and Regla. The young branches are nearly an inch in diameter.

39. *The Hartweg Pine* (Pinus Hartwegii). Leaves 4, very slender, about 6 inches long. Cones pendulous, oblong, obtuse, clustered, about 4 inches long, with depressed truncated scales, having a projecting callosity in the middle. A Mexican tree 40 or 50 feet high. The cones are of a clear greyish-brown, and of nearly the same diameter throughout.

** *Scales of Cones spiny at apex.*

40. *The West Indian Pine* (Pinus occidentalis). Leaves 5, pale green, slender, much longer than the cones. Cones ovate-oblong, obtuse, stalked, with rounded, angular, prominent scales, tipped by a sharp prickle. A native of St. Domingo, on the mountains where snow occasionally falls.

41. *The long-leaved Pine* (Pinus macrophylla). Leaves 5, from 14 to 15 inches long. Cones straight, horizontal, ovate, tapering, solitary; 6 or 7 inches long, and about 3 inches broad at the base, with the ends of the scales strongly hooked backwards. A small tree from the North of Mexico.

Div. 2. *Scales of Cones flat, and compressed at the apex.*

42. *The Mexican Cembra* (Pinus Cembroides or Llaveana). Leaves 3, short, tufted, glaucous, and twisted.

Cones small, roundish-ovate, hard, with elevated roundish obtuse scales. Seeds large, eatable. A small Mexican tree, occurring in large forests, and producing seeds similar to those of the Stone and Neoza pines.

43. *The Cembra Pine* (Pinus Cembra). Tree erect, conical. Leaves 5, with no sheath, short, stiff, glaucous green. Cones ascending, oblong, about the length of the leaves, with thin callous-pointed scales. Seeds large, without wings. A tree of considerable size, inhabiting the sides of mountains in Siberia, Tartary, Switzerland, and Italy. It is very ornamental and hardy, grows tolerably fast, and produces a fragrant, fine-grained, soft wood, well suited for carvers and turners. The seeds yield a large quantity of oil of good quality.

44. *The Weymouth Pine* (Pinus Strobus). Trunk erect, very lofty. Leaves 5, slender, bright green, without sheaths. Cones narrow, long, pendulous, from 5 to 6 inches long, with thin ovate callous-pointed scales. A native of Canada, and others of the more northern districts in North America. It grows very fast, and produces the clean, soft, white, but perishable timber imported from America under the name of 'Pine.' Of this species, *P. monticola* of Douglas, seems a mere variety.

45. *The Lofty Pine* (Pinus excelsa). Trunk erect, very lofty. Leaves 5, bright green, distinctly glaucous on one side, with no sheath, leaves narrow, long, pendulous, stalked, from 6 to 7 inches long, with thin lax, ovate, callous-pointed scales. A fine Himalayan tree, bearing the climate of England without protection. It has very much the habit of the Weymouth pine, but its leaves are more glaucous and the cones are larger.

46. *The Lambert Pine* (Pinus Lambertiana). Trunk erect, very lofty. Leaves 5, rather stiff, bright green, roughish, with no sheaths. Cones very large, pendulous, from 14 to 18 inches long, with broad rounded scales. Seeds large, eatable. An enormous tree found by Douglas in New Albion, on sandy plains where no other vegetation exists. Specimens were found 200 feet high and more. The wood is spongy, and of no value except for fire-wood. The seeds are collected by the Indians for food.

47. *The Ayacahuite Pine* (Pinus Ayacahuite). Leaves 5, with deciduous sheaths, slender, very glaucous on one side, sharp-pointed, from 2 to 4 inches long. Cones drooping, a foot or more long, very slender, with distant, oblong-lanceolate, obtuse, spreading scales. A gigantic tree resembling the Weymouth pine in habit; found by Ehrenberg near Omitlan in Mexico, and by Hartweg in Guatemala. It produces an unusually large quantity of a clear, bright, amber-coloured resin.

Besides the foregoing, the following species of Pine are mentioned in books, but they are too imperfectly known to be worth further notice in this place: viz. *P. californiana* or *montereyensis, timoriensis, muricata, tuberculata, radiata, contorta, squamosa, turbinata.*

(Loudon's *Arboretum et Fruticetum Britannicum*, vol. iv.; Lambert's *Monograph of the genus Pinus.*)

PINUS BALSA'MEA. [ABIES, p. 30.]

PINYARI. [HINDUSTAN D. 219.]

PIOMBI'NO. [SIENA.]

PIOMBO, SEBASTIAN DEL, an eminent painter, both of portrait and history, was born in 1485, at Venice, whence he was called also Veneziano. His surname, according to Lanzi, was Luciano, though it does not appear that he was known by it in his own time, or that he ever marked his pictures with it. On his principal performance in oil, the Raising of Lazarus, the words 'Sebastianus Venezianus faciebat' appear in characters no doubt traced by himself. He was a skilful musician, particularly on the lute, but abandoned that science for painting, the rudiments of which he acquired under Bellini, but afterwards became the disciple of Giorgione, whose style of colouring he carefully studied and successfully imitated. He first distinguished himself as a portrait painter, to which his powers were peculiarly adapted. His portraits are boldly designed and full of character; the heads and hands are admirably drawn, with an exquisite tone of colour and extraordinary relief. The most famous of his works in this class were portraits of Giulia Gonzaga, the favourite of Cardinal Hippolito de' Medici, which by writers of that age was called a divine performance, and of Pietro Aretino, in which he distinguished five different tints of black in the dress, imitating with wonderful exactness the difference of the velvet, the satin, and other materials of the drapery.

The first historical picture which established his reputation was the altar-piece in the church of S. Gio. Crisostomo, at Venice, which from its richness and harmony of colouring has frequently been mistaken for a work by Giorgione. Sebastian was invited to Rome by Agostino Chigi, a rich merchant, who traded at Venice, by whom he was employed in ornamenting his palace of the Farnesina, in conjunction with Baldassare Peruzzi, where Raffaelle had painted his celebrated Galatea. Thus painting in competition, he found his own deficiency of invention, to remedy which he studied the antique, and obtained the instruction and assistance of Michael Angelo. Indeed it is said that that illustrious painter, growing jealous of the fame of Raffaelle, availed himself of the powers of Sebastiano as a colourist, in the hope that, assisted by his composition, Piombo might successfully rival the efforts of Urbino. Michael Angelo accordingly furnished the designs for the Pietá, in the church of the Conventuali at Viterbo; and the Transfiguration and the Flagellation in S. Pietro, in Montorio, at Rome, the execution of which however, in consequence of Piombo's tedious mode of proceeding, occupied six years. The extraordinary beauty of the colouring and the grandeur of Michael Angelo's composition and design, in these celebrated productions, were the objects of universal surprise and applause.

At this time cardinal Giulio de' Medici commissioned Raffaelle to paint his picture of the Transfiguration, and being desirous of presenting an altar-piece to the cathedral of Narbonne, of which he was archbishop, he engaged Sebastiano to paint a picture of the Raising of Lazarus, of the same dimensions. 'On this occasion,' says Bryan, 'he was again assisted by the powers of Buonarotti, by whom it was composed and designed. The picture was publicly exhibited at Rome, in competition with the Transfiguration; and it is no mean proof of its extraordinary merit, that, notwithstanding the transcendent beauty of Raffaelle's chef-d'œuvre, Sebastiano's performance excited universal admiration.' This picture was removed, by the regent of France, from the cathedral of Narbonne into the Orleans collection, whence it was purchased by the late J. J. Angerstein, Esq., for two thousand guineas, and is now deposited in the National Gallery. It is painted on canvas, and its size is thirteen feet six inches high, by nine feet five inches wide.

Sebastiano was greatly patronised by Pope Clement VII., who conferred upon him the office of keeper of the papal signet, which was the cause of his name, Del Piombo, in allusion to the lead of the seal. This post rendering it necessary that he should assume a religious habit, he abandoned the profession of a painter, and was thenceforth called Frate Bastiano del Piombo. His last work was the chapel of the Chigi family, in Santa Maria del Popolo, which he left imperfect, and it was afterwards finished by Francisco Salviati. He died of a fever, at Rome, in 1547, at the age of sixty-two years. He is said to have been the inventor of painting upon walls with oil-colour, and of preventing the colours from becoming dark by applying, in the first instance, a mixture of mastic and Grecian pitch, or, according to some authorities, a plaster composed of quick-lime, pitch, and mastic.

'Portrait, in its most genuine sense,' observes Fuseli, 'was the province of Sebastiano. Nature had given him an eye to penetrate and, with practice, to transcribe the character and beauties of single objects, but had refused him all ideal power—that energy of mind which commands and unites a numerous whole. As slow and irresolute in conceiving, as ambitious of painting historic subjects, he readily promised what he began with reluctance and finished with fatigue.'

(Lanzi, *Storia Pittorica*, iii. 66; Pilkington's *Dict.*, by Fuseli; Bryan's *Dict.*)

PIOZZI, MRS., was originally Miss Esther Lynch Salusbury, being the daughter of John Salusbury, Esq., of Bodvel in Carnarvonshire, where she was born in 1739. Her good looks and vivacity early acquired her some distinction in the London world of fashion, which ended in her marriage, in 1763, to Mr. Henry Thrale, an opulent brewer in Southwark, and then one of the members for that borough. It was soon after she became Mrs. Thrale that her acquaintance with Dr. Johnson commenced, which is the circumstance to which her name principally owes any place it may hold in the annals of our literature. But Thrale having died in 1781, his widow retired, with her four daughters, to Bath, and there, having met with an Italian music-master, of the name of Gabriel Piozzi, fell in love with and married him in 1784; and that proceeding, from which her old friend earnestly endeavoured to dissuade her, produced a complete rupture between them a short time before Johnson's death. This nevertheless did not prevent Mrs. Piozzi from publishing, in 1786, an octavo volume of gossip, entitled 'Anecdotes of Dr. Samuel Johnson, during the last Twenty Years of his Life.' Many things in this publication gave great offence to Boswell and Johnson's other friends, who professed to regard it as having been prompted mainly by feminine spite and revenge; but although they might not be far wrong in this conclusion, there was also ground for some retaliation from the other side; and the view which a large portion of the public took of the feud between the parties may be seen in Dr. Wolcot's (Peter Pindar's) humorous poem entitled 'Bozzy and Piozzi.' Meanwhile Mrs. Piozzi followed up her first book by another, in 1788, entitled 'Letters to and from Dr. Samuel Johnson,' in two vols. 8vo. But before this she had gone with her husband to Florence, and there, in conjunction with three gentlemen, named Merry, Greathead, and Parsons (the once famous but now almost forgotten founders of the Della Crusca school of poetry), she printed but did not publish, in 1786, a collection of pieces in prose and verse, under the title of 'The Florentine Miscellany.' Mrs. Piozzi's other works are, 'Observations and Reflections made in the course of a Journey through France, Italy, and Germany,' two vols. 8vo., 1789; 'British Synonymy, or an Attempt at regulating the Choice of Words in Familiar Conversation,' 2 vols. 8vo., 1794; and 'Retrospection, or a Review of the most striking and important Events, Characters, Situations, and their Consequences, which the last Eighteen Hundred Years have presented to the view of Mankind,' 2 vols. 4to., 1801. She is said to have also contributed many anonymous pieces, both in prose and verse, to the periodical publications of her day; but it has generally been admitted that nothing she wrote at a later date is so good as some poems she contributed so early as in 1765 to the volume of 'Miscellanies' published by Anna Maria Williams, particularly one called 'The Three Warnings,' the superior merit of which, rather than any proper authority for the fact, has led to the opinion that she was materially assisted in its composition by her friend Johnson. It certainly however is not much in Johnson's style. Mrs. Piozzi survived her second husband, and died at Clifton near Bristol, on the 2nd of May, 1821.

PIPA. [Frogs, vol. x., p. 493, 496.]

PIPE. A column of air contained in a tube and maintained in a state of vibration yields a musical sound, depending upon its length and (slightly) upon the state of the atmosphere. Our object in the present article is to give such an account of the theory of a musical pipe as may, with the articles Acoustics, Cord, Harmonics, Scale, Temperament, &c., complete the statement of the leading principles of sound and doctrines of music.

We shall begin by correcting one mistake in each of the articles Acoustics and Cord. In the former (p. 97) the number of vibrations of the middle A of the treble clef is given; these, with the meaning of the term vibration as used in that article, should all be doubled, since the numbers there given (from the Berlin Transactions) mean complete or double vibrations, answering to double waves of sound (or a condensation and rarefaction in each). The mean value in that page gives 430 double vibrations for the note A, a result we shall presently use. Dr. Smith, in his Harmonics (1749), found, by comparison of an organ-pipe with a wire, that the D next below the A just mentioned gave 254, 262, and 268 double vibrations per second in a cold day of November, a temperate day of September, and a warm day of August: taking 262 as the mean, this would give only 393 double vibrations for A instead of 430. If then all the experiments are trustworthy, the A of Dr. Smith's organ (at Trinity College, Cambridge) must have been nearly a tone below that of the orchestras of our day.

We have often heard it said that what is called concert-pitch had risen considerably in the last century, but we had no idea, till we met with Dr. Smith's experiment, that there was any positive foundation for the assertion.

Throughout the formulæ in the article Cord g must be read[*] instead of $2g$. The result of the example [page 6, Cord] should be 323·8 instead of 458.

In this subject a distinct line should be drawn between those circumstances which are of easy and difficult explanation: for example, to a person who thoroughly understands the composition of waves moving in opposite directions [Acoustics, pages 93, 94] it is not difficult to point out what the state of a pipe must be when in musical vibration; but to explain how the action of a current of air, as in the common flute, or the joint action of the air and a reed, as in the clarinet or reed-stops of an organ, produces and maintains this state of vibration, is quite another thing.

We shall first consider the pipe in a state (no matter how produced) of continued sonorous vibration, yielding the lowest note which it will give: let it be a simple pipe open at both ends, and let it be sounding, say the C of the treble clef next below the A above mentioned, or the first below the lines of that clef. This note requires 258 double vibrations per second, A requiring 430. If we now remember that the air at the two extremities is in communication with the outer air, we see that no condensation or rarefaction can take place at those extremities, or only very small ones compared with those which take place in the interior of the tube. To get approximately at the conditions of vibration, let us suppose that no condensation or rarefaction takes place at the extremities. We then see [Acoustics, pp. 93, 94] that the state of the pipe, its two extremities never being condensed or rarefied, is as it would be if two waves of sound were travelling in opposite directions, every particle of the interior being affected by the joint condensations and velocities of both. Moreover, the distance between two uncondensed particles is always the whole length of the wave of condensation or that of rarefaction, or a multiple of this length; that is, the pipe must be either the half-length of a double wave or a multiple of this half-length. When the pipe sounds the lowest note, it must give the longest wave; that is, the length of the pipe must be that of the simple wave of condensation or rarefaction. Hence the lowest note which a pipe can yield, which is called its *fundamental* note, is that belonging to a double wave of sound which is double of its length. Each double wave answers to a complete or double vibration of a string.

To compare this result with practice, let us suppose sound to travel at the rate of 1125 feet per second (temperature 62° Fahr.). The note C having 258 double vibrations per second, this 1125 feet must contain 258 double waves, or each double wave must be 4·36 feet. The single wave then is 2·18 feet, or 2 feet 2 inches and ·36 of an inch, which is the *theoretical* length of the pipe. Now the organ-builders say 2 feet [Organ, Construction of, vol. xvi., p. 498], but this of course is a rough description, since the French organ-builders also say 2 feet (according to Biot), and the French foot is longer than the English. Further on in the article referred to we see 2 feet 2 inches given as the length of this C in an open pipe (the dulciana), and 1 foot 1 inch in a stopped pipe (the stopped diapason), which, as we shall presently see, ought to be half as long as an open pipe. The common flute, when everything is stopped, gives this same C, and the length from the embouchure (or mouth-hole) to the end of the instrument is a little more than 2 feet, but certainly never 2 feet 2 inches. It must be remembered however that this instrument is made up of the flute (so called) and the player, whose lips, when they come over the embouchure, confine the air, and are equivalent to a slight lengthening of the pipe. It is not the manner of blowing which does this, but the approach of the lips, as may be thus shown. Take a common flute, and, without holding it to the lips, strike the uppermost hole with the finger; a faint sound will be heard. Now approach the lips to the embouchure, but without blowing, and then strike the same hole with the finger; another faint sound will be heard, decidedly flatter than the former. It is well known to those who play on this instrument (to those who play in tune at least) that drawing the lips back, so as not so much to confine the air contiguous to the embouchure, sharpens the tone, and what some persons call *humouring* the instrument means continual alteration of the position of the lips, so as to shorten or lengthen the pipe by turns, according to the note to be sounded. It is also well known to players that this humouring can be carried to a much greater extent with the high notes than with the low notes; but so little were the practical musicians in connection with the theoretical in the time of Daniel Bernoulli (who first gave the mathematical theory of this subject), that this simple fact was only discovered by him from a new and somewhat complicated experiment.

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[*] The cause of this error is an inadvertency in the article *Sound* in the 'Encyc. Metrop.,' the distinguished author of which has himself forgotten that he was using g in a different sense from the usual one, and (p. 780) makes the velocity of a pulse along a stretched cord to be that acquired in falling down the length of the portion of the cord whose weight is equal to the tension, whereas it should have been half that length.

In the preceding theory all the parts of any section of the pipe perpendicular to its axis are supposed to vibrate in the same manner. This cannot be the case in the common flute or in the organ-pipe, in which the cause of condensation is supplied at the side; and in fact all experiments in which the cause of undulation has been equally applied over all the parts of a section perpendicular to the axis, have agreed in the result that the time of vibration is wholly independent of the diameter of the tube: while those in which the same was not equally applied give the result that the greater the diameter the lower is the tone. Moreover, when an orifice is made in the side of a pipe, as in the flute, it is not equivalent to the formation of a new pipe terminating at that orifice, though the results are somewhat resembling. Any note between the fundamental note and its octave may be obtained by an orifice of one size or another made at or near the middle of a pipe.

We have seen that we may suppose the extremities of the open pipe to contain between them 2, 3, &c. half-waves, which, the whole pipe being one half-wave in length, will give the Harmonics of the fundamental note. This subject is sufficiently treated in the article cited.

Various instruments yield different harmonics more or less readily; the general rule being that the more violent the agitation which produces the sound, the larger the number of half-waves formed in the tube, and the higher the harmonic: also that a certain diameter, the larger the greater the length of the tube, is necessary to the production of the fundamental note. Thus, if an organ-pipe be too small in the bore, it will yield the octave of the fundamental note; or if the latter, only with great attention to the *voicing*, or adjustment of the orifice through which the wind enters. If the bore of a flute be too narrow (which we imagine to be the case in modern instruments), the lower notes will be difficult to obtain. And the various harmonics are produced with very different degrees of facility; a circumstance of which the theory can give no account. Thus, players on the trumpet find it exceedingly difficult to produce that tone which divides the instrument into seven parts, or the flat seventh in the third octave above the fundamental note; while in the flute there is no moderately skilful player who cannot produce it. It is to be observed however that all pipes of the trumpet class are of tapering diameter; and though they agree in all material points with the theory of cylindrical and prismatic pipes, it is not remarkable, in the present state of the mathematical analysis of this subject, that they should present circumstances difficult of explanation.

It will be obvious, from the considerations in Acoustics, that when the extremities of the pipe contain between them n half-waves, there will be $n+1$ points (the orifices included) at which the velocities are always greater than elsewhere, and no condensations or rarefactions; and n points (in the middle of the subdivisions), at which the condensations or rarefactions are always greater than elsewhere, and which are always at rest or nearly so. These immoveable points are called nodes of vibration; and there is one of them in the middle of the tube only when the number of half waves in the pipe is odd.

Let us consider the case of a pipe with one end closed. It is obvious now that the open extremity is a point of no condensation, while the closed extremity must be a node, or point of no velocity. Hence the tube must be the half of an odd number of simple waves in length, twice the tube must be an odd number of simple waves, and four times the tube an odd number of double waves in length. Hence the fundamental note belongs to a double wave of four times the length of the tube; so that the fundamental note of a pipe closed at one end is an octave lower than that of the same pipe open at both ends. It is the same thing to say that a pipe of half the length of an open pipe, closed at one end, gives the same note as the open pipe. This is the reason why the pipes of the stopped diapason stop of an organ are halves of the lengths of those of the open diapason.

Again, since the double length of the pipe is an odd number of simple waves, the harmonics which the pipe can yield are not the complete set yielded by the open pipe of double the length, but every other one, beginning from the fundamental note. The number of vibrations per second being 1, those of the harmonics producible by the pipe closed at one end, are 3, 5, 7, &c. We will leave the pipe closed at both ends (a matter of no practical concern, since its sound could not be heard) to the student; the result he should arrive at by the preceding considerations, is that it is in all respects analogous to the vibrating Cord fixed at both ends. But he must not infer, by a reversed analogy, that the vibrations of an elastic body fixed at one end (as the spring of a tuning-fork) answer to those of a pipe closed at one end, since their law is very different.

It is usual first to give the theory of a closed pipe, and then to suppose the open pipe made of two closed pipes, with their closed ends together, and their closing diaphragms removed. The opposition of the vibrating movements will then keep the particles in the middle at rest. This is a sufficient explanation of those modes of vibration of the open pipe in which there is a node in the middle.

We now come to the explanation of the manner in which the sonorous vibration of a pipe is maintained. If we suppose a vibrating body placed at the orifice, it is found that if the vibrations of the body be equal or nearly equal to those of the fundamental note of the tube in the preceding theory, or one of its harmonics, the sound of the vibrating body is reinforced by the tube. A slight alteration of the tube, though it may sharpen or flatten the note, does not by any means produce such a difference as would be caused by the same alteration, if the sound were caused by the tube alone. We do not intend to go into this subject; the reader may find it discussed, both mathematically and experimentally, in a paper by Mr. Hopkins, published in the fifth volume of the Transactions of the Cambridge Philosophical Society.

When the sound is caused by a current of air, as in the common flute or simple organ pipe, a tolerably satisfactory explanation of the phenomena has been given in the case of the pipe closed at one end (to which writers have confined themselves); but none whatever in that of the pipe which is open at both ends. In the former case, as in a reed of the Pan's pipe, a current of air is directed laterally over the mouth of the pipe, with a slight obliquity of direction. A condensation is therefore produced in the tube, which travels to the closed end, and is there reflected; so that by the time the condensation has travelled over twice the length of the tube (down and back again), the whole condensation, such as it was when it begun, is doubled. Hence the air in the tube has now become more powerful than the external stream, and the condensed portion begins to be discharged. This continues until not only the whole of the condensation is discharged, but also until all the velocity of the issuing particles has been destroyed; and this is not done until the effect of that velocity has produced a rarefaction in the tube. The effect of the condensation is destroyed in the same time as that in which it was produced; and hence the complete undulation belonging to the whole length of the closed tube is four times the length of the tube. Imperfect as the preceding explanation is, we know of no way of applying even so much to the open tube.

It is also to be noted that the whole of the preceding theory is but an approximation. The extremities of the open tube are not points of absolute non-condensation and non-rarefaction, but points at which the condensations and rarefactions are least and small. Similarly the nodes are not points in which the air is absolutely at rest, but points at which the motion is least. The extensions of this theory, however, important as they are in a physical point of view, are not essential to that fundamental explanation of the musical phenomena of a pipe, to which we have expressed our intention of confining ourselves in the present article.

PIPE (measure), a name given to two Hogsheads of the old wine measure; two hogsheads of ale or beer were called a butt.

PIPE-OFFICE, or more properly the Office of the Clerk of the Pipe, a very antient office in the court of Exchequer. This was formerly at Westminster, but removed to Somerset-house towards the close of the last century, where the duties of the office were performed and where the records belonging to it were kept till the abolition of the office of clerk of the pipe, and with it that of the comptroller of the pipe, by the act 3 and 4 William IV., c. 99. By that act the records which had been accumulated in the performance of the duties of this office were transferred to the custody of he king's remembrancer of the exchequer.

The business of the office had been much reduced by former acts of parliament, viz. by an act of 52 George III., which transferred the management of portions of the land-revenue of the crown to the office of woods and forests, and by acts of 1 and 2 George IV., c. 121, and 3 Geo. IV., c. 88, which transferred the duty of recording what were called the foreign accounts, or those of supplies granted by parliament, to the audit and tax offices.

Still in this office was made up year by year the record called the great roll of the pipe, or more correctly the great roll of the exchequer, in which was entered the revenue accruing to the crown in the different counties of the realm, for the charging and discharging the sheriffs and other accountants. Of this roll the deputy clerk of the pipe gives the following account in reply to the circular questions of the commissioners on the public records in 1832:—'The antient revenues here recorded were either certain or casual. The certain revenue consisted of farms, fee farms, castle-guard rents, and other rents of various kinds; the casual part was composed of fines, issues, amercements, recognizances, profits of lands and tenements, goods and chattels received into the hands of the crown on process of extents, outlawry, diem clausit extremum, and other writs and process; wards, marriages, reliefs, suits, seignories, felons' goods, deodands, and other profits casually arising to the crown by virtue of its prerogative.' (*Report of Commissioners of Public Records*, 1837, p. 198.)

Of these annual rolls there is a series commencing in the second year of King Henry II., in the year of our Lord 1155, and continued to the breaking up of the office in 1834. It is justly spoken of by Madox, the author of 'The History of the Exchequer,' as 'a most stately record,' and it is said that no country in Europe possesses any record that can be compared with it. Two only of these rolls have been lost. It approaches, as we see, in antiquity to about seventy years from the date of the preparation of the great survey of England by the Conqueror, known by the name of 'Domesday Book.' It abounds, it may be added, with valuable notices of the persons who are distinguished in English history through the whole of this period, and of the transactions of the time, recorded in every instance by a contemporaneous hand.

There is one roll of a still earlier date, which has evidently been saved by some fortunate chance when the other rolls of the same reign perished. It was formerly thought to be the roll of the 1st of Henry II; but the antiquaries of the seventeenth century, on an imperfect survey of its contents, determined that it belonged to the fifth year of King Stephen. Accordingly it has been regarded in the office as a roll of that reign, and as the roll of the 5th of Stephen it has been repeatedly quoted by historical writers, and especially by Dugdale, in his 'History of the Baronage of England,' and who, in numerous instances, has referred facts mentioned in it to the fifth year in the reign of Stephen. Madox also often quotes it as the roll of the 5th of Stephen, though he saw enough in it to lead him to refer it to the reign of Henry I. This roll has been printed and published by the late commissioners on the public records, and Mr. Hunter, one of the sub-commissioners, prefixed to it a disquisition on the year to which it belongs, in which he has shown that it is the roll of the thirty-first year of the reign of King Henry I.: thus carrying it back into the reign of one of the sons of the Conqueror, from which scarcely any national record except this has descended, and removing at once all the great historical difficulties which have arisen out of the unfortunate reference of it to the reign of his successor Stephen.

The commissioners on the public records have printed other portions of the early pipe rolls, but the volumes have not been completed.

Beside the great roll, there was a similar roll prepared by the comptroller of the pipe, which has been called the chancellor's roll. This series is far less complete than the other; and as it differed but slightly from the great roll and was never consulted, and as it appeared desirable that access should be made easier to it than could be the case while it remained in the custody of the officers of the exchequer, the late commissioners on the public records directed the removal of it to the British Museum, where the several rolls may now be consulted under the same regulations to which the other manuscripts in that depository are subjected.

The conjectures respecting the origin of the name of pipe as applied to this officer and to the great roll of the exchequer are scarcely deserving notice. One conjecture is that the rolls are so called because in form they resemble pipes another that they were transmitted through a certain pipe from one room of the exchequer to another. It may be considered as an undecided question.

PIPER, *Piper Betle*, Linn., and *Piper Siriboa*, Linn. The leaves of these two species are extensively used by the natives of the East Indies, and lately of the West, to chew along with the nut of the Areca Catechu and quick-lime, as a restorative of the powers of the stomach and promoter of digestion. It is capable however of producing, like some other species of piper, intoxicating effects, and should be used in moderation. (Curtis, *Bot. Mag.*, t. 3132.)

It is also employed, in the form of the freshly expressed juice, as a febrifuge medicine, and as an antispasmodic, especially against obstinate dry coughs.

PIPER CUBE'BA, Linn., is generally regarded as the source of the officinal cubebs; but, according to Blume, P. canicum, Rumph., which is the P. cubeba of Roxburgh, yields the greater portion of the cubebs of commerce. The fruits of both are stalked, but that of the former is larger and has more pungency than the latter. Both are common in Java, where, as in other parts of India, they are used as a grateful condiment, as common pepper is in Europe. They are also employed medicinally in the same complaints as give them repute in Europe.

The berry is small, about the size of black pepper-corns (but with a little foot-stalk, from one-third to half an inch long, hence called sometimes P. caudatum or P. pedicellosum), more or less round, of a blackish-grey or greyish-brown colour, with a thin vascular reticulated husk, which encloses a hard round oily seed. The husk has a pleasant taste; the seed a bitterish, acrid, peppery, aromatic, and camphor-like flavour.

Those which come from the islands of the Indian archipelago are the best. A sort from the Mauritius, small, or about the size of a millet-seed, are from some unknown species. The Guinea or African cubebs is the produce of Piper Afzelii.

Indian cubebs are frequently adulterated with black pepper, pimento berries, or the fruits of the Rhamnus catharticus. Genuine cubebs consist of waxy matter, two kinds of volatile oil, a peculiar resin (cubebin), balsamic resin, &c.

The volatile oil by rest deposits a camphor, which crystallizes in four-sided plates. The resin is analogous to that of copaiva, and has, like it, a peculiar influence over mucous membranes, especially those of the urino-genital organs.

PIPER LONGUM, a native of the East Indies, the female spike of which, having attached to it the dried half-ripe berries (resembling the catkin of the birch), is used in medicine. It has nearly the same chemical composition and properties as black pepper, though feebler. It is said to contain *piperin*. The root is employed by the Hindoos, but it is still weaker than the fruit.

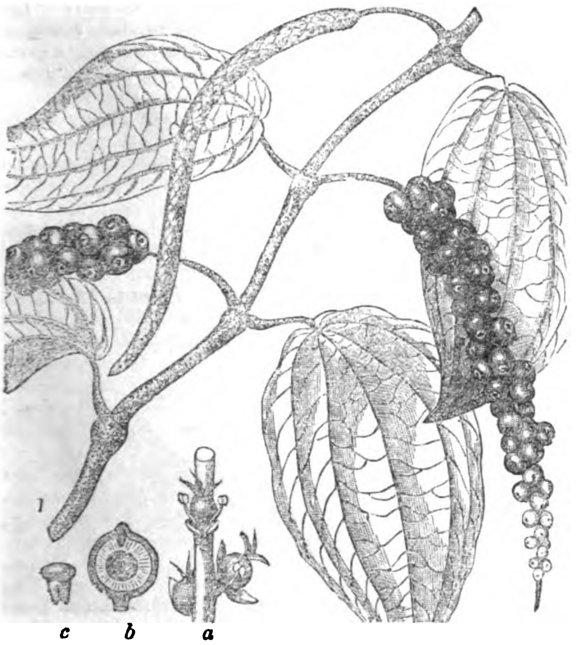
PIPER NIGRUM, Linn., a climbing plant of the East Indies, and very extensively cultivated there, the plantations stretching from the 96th to the 115th degree of E. long., and from the 5th degree of S. lat. to the 12th of N. lat., which limits comprise Sumatra, Borneo, the Malay Peninsula, and all countries to the east of the Gulf of Siam. The best pepper comes from Malabar, the least esteemed from Java and Sumatra. The plant is allowed to grow, trained to the stem of the Areca Catechu, and other trees, especially the Jack (Artocarpus) and Hyperanthera Moringa (or horse-radish-tree), four years before the fruit can be collected. The berries are gathered when yet green, before they are perfectly ripe, and quickly dried on mats, by which they turn black. When plucked too young, they speedily fall into a state of powder. These are separated from the others by sieves and winnowing. In this condition it is termed black pepper. White pepper is the same fruit freed from the outer rind: for this purpose, the ripe berries are allowed to macerate in water and the husk is removed. These are smaller, smooth, of a greyish-white colour, varying to yellow, with a less powerful odour and taste than the black.

According to the analysis of Pelletier, black pepper contains an acrid soft resin, a volatile oil, piperin, extractive, gum, bassorine, malic, and tartaric acids, salts, &c.

The odour of pepper is probably due to the volatile oil, which is not acrid; the pungent taste is most likely owing to the resin. Piperin, the exact nature of which is not ascertained, when perfectly pure, is nearly tasteless and colourless; but it is generally yellow, from the presence of some resin, to which it is most probably indebted for its virtues, as when purified by means of æther from all resin, it seems devoid of power, and the febrifuge virtues ascribed to it belong in reality to the acrid resin. Pepper is much more employed as a grateful condiment than as a medicine, and it appears to be essential to the process of digestion in hot countries. Of 50,000,000 pounds of pepper collected, one-third only goes to Europe, the greater portion being consumed by the Chinese. Its moderate use with cold raw vegetables or other substances difficult of digestion is to be approved; its employment in excess is hurtful to the liver, and a very large dose may prove fatal, not only by exciting inflammation of the stomach, but by an impression on the nervous system. Black pepper readily poisons hogs.

Whole pepper is a popular remedy against intermittent fevers, and impure piperin is used beneficially in like cases.

PIPERA'CEÆ, a small natural order of incomplete Exogens, is composed of climbing or creeping plants with alternate or opposite exstipulate leaves, jointed stems, and spiked naked flowers consisting of an ovary containing a single erect ovule, and of from two to an indefinite number of stamens. The fruit, when ripe, is more or less fleshy, indehiscent, and contains a single seed filled with albumen, on the outside of which, enclosed in a vitellus, is a minute embryo. Jussieu originally regarded these plants as members of the Urticaceous order; but afterwards separated them, in which he has been followed by all botanists. There is however some difference of opinion as to their class, some regarding them as Exogens, and others as Endogens. See Lindley's *Natural System*, ed. 2, p. 185, for an account of these opinions. The general properties of the order are aromatic, as in the peppers of the shops. [PIPER.]



1. Piper nigrum. *a*, portion of the spike of Piper aromaticum; *b*, a section of its fruit; *c*, its embryo.

PIPERIN, a peculiar principle of black pepper, first described by Oersted in 1819. It is obtained by digesting coarsely powdered pepper repeatedly in water, and the insoluble portion in alcohol. The spirituous solution evaporated to the consistence of a syrup yields crystals, which, when purified by animal charcoal, possess the following properties: they are pale straw-coloured four-sided prisms; have but little taste, are insoluble in cold water and slightly soluble in hot water; readily soluble in alcohol, less so in æther. Piperin dissolves readily in acetic acid, and by evaporation it is obtained in plumose crystals; sulphuric, nitric, and muriatic acids, when concentrated, alter its nature, and when dilute they have but little action upon it. To concentrated sulphuric acid it gives a blood-red colour; to nitric acid, a greenish-yellow, then orange, and at last a red colour; and to muriatic acid, an intense yellow.

Piperin fuses at about 212°, and when distilled it yields water, acetic acid, oil, and carburetted hydrogen gas.

Analysis according to Liebig:—Carbon, 69·78; hydrogen, 6·69; oxygen, 19·43; azote, 4·10.

PIPILLO. [TANAGRINÆ.]

PIPOWDER COURT. By the common law every owner of a fair or market [MARKET] is bound to hold a court for the decision of matters arising therein. The court being instituted principally for the convenience of the itinerant dealer, in Norman French 'pied pouldreux,' was called the court of pipowders, 'curia pedis pulverizati.' The court is held before the owner of the fair or market, or his steward, who, by 17 Edward IV., c. 2, is prohibited from entertaining any action unless the plaintiff or his attorney swear that the cause of action arose within the precincts and during the time of the same fair or market. Before that statute these courts appear to have emulated those of Westminster Hall in seeking to extend their jurisdiction; and in the preceding reign, W. Larke, the servant of a burgess coming to the parliament, was arrested in the fair of the abbot of Westminster. He was transferred by his creditor, Margerie Janyns, to the Fleet, where he remained till, by the interference of the House of Commons, he obtained his discharge. (4 Rot. Parl., 357.)

This court in its turn has been gradually encroached upon by the superior courts, and is now fallen into nearly total disuse.

PIPPI. [GIULIO ROMANO.]

PIPRA. [PIPRIDÆ; PIPRINÆ.]

PI'PRIDÆ, the name given to a family of *Dentirostres*, by Mr. Vigors, who remarks that those birds which we denominate *Chatterers*, and which form the genus *Ampelis* of Linnæus, are usually asigned a place near the family *Merulidæ;* and he confesses that, from the general affinity they appear to bear to it, he had felt, and when he wrote his valuable paper 'On the Natural Affinities that connect the orders and families of Birds' (*Linn. Trans.*, vol. xiv.), did, it is plain, still feel considerable doubt whether this was not their natural station. A strong affinity however, on the other hand, seems, he observes, to unite them with the wide-gaped *Pipræ*, and some of those other groups which, by their bill, broad and depressed at the base, appear to come in contact with the earlier divisions of the *Merulidæ*, and the extremes of the *Fissirostres*, which precede it. The general rule of placing groups in a conterminous situation, according to what appears to be the predominance of their more important characters, inclined him however to arrange the birds of which he speaks provisionally among the *Pipridæ*, at the extreme termination of the *Merulidæ*. In his view of the case at that time, the characters in which they accord with that family, and approximate the extreme groups of the preceding tribe (*Muscicapidæ*), appear to predominate. More accurate knowledge, he adds, will clear away these and similar difficulties.

Thus much Mr. Vigors observes when treating of the family *Merulidæ*. He next treats of the *Sylviadæ*, and, on leaving that family, he remarks that the true *Wrens* of the *Sylviadæ* display in their general appearance and habits so close a similarity to *Parus*, Linn., the *Titmouse* of English naturalists, that he thinks we may at once acknowledge the affinity between the latter family and that of *Pipridæ*, upon which he enters by means of the *Pari*. 'Who is there,' says Mr. Vigors, 'that has not been attracted by the interesting manners of both these familiar visitors of our domestic haunts, and, at the same time, has not been struck by their resemblance? The *penduline Titmouse, P. pendulinus*, Linn., longer and more slender in its bill than the *Pari* in general, seems to be the connecting link between the families. That species is immediately met by the genus *Tyrannulus* of M. Vieillot, which, in the name of *Roitelet Mesange*, conferred by M. Buffon on the American species of which it is composed, happily illustrates the affinity which I have ventured to point out.' Mr. Vigors further remarks that the same affinity is indicated by the antient British name of the Golden-Crested Wren, which is called in Cardiganshire *Syvigw*, that is, according to Ray, *Parus chrysocephalus;* and he proceeds to trace another affinity between the conterminous groups of *Wrens* and *Titmice* in their mode of nidification. The greater portion of both, he remarks, make their nests in holes of trees: but those groups which more nearly approach each other, viz. *Regulus, Tyrannulus*, and *Parus pendulinus*, suspend theirs from the branches, leaving the orifice at the centre, and interlacing the materials of which it is composed with corresponding ingenuity and elegance. The contiguity of this small group, he adds, to those of *Carduelis*, *Ploceus*, and *Xanthornus*, in the succeeding tribe of *Conirostres*, seems to point out the cause of this singular affinity. But though the affinity between these birds has been acknowledged by scientific as well as by common observers; the former, Mr. Vigors remarks, have generally ranked the *Pari* in a different tribe, and some indeed, he adds, have even ranked them in a different order from the *Sylviadæ*, in consequence of their more conical bill and the absence of the mandibulary notch. 'A rigid deference,' continues Mr. Vigors, 'to those particulars which form the characteristics of the conterminous subdivisions would certainly exclude the *Pari* from the present tribe of *Dentirostres*. But the nature of their food, which consists chiefly of insects, and the similarity of their habits, give them a more natural connection with the families among which I have now ventured to point out their place, than with the hard-billed and granivorous birds, where they are generally stationed. Here it may also be observed, that they form part of one of the extreme families of the tribe, and are immediately connected with a group of the preceding family of *Sylviadæ*, which passes on to the *Conirostres*, the succeeding subdivision of the order. They thus are brought into contact with the tribe to which the strength and the conical structure of their bill indicates a conformity; while, at the same time, they maintain their station among the groups where their manners and general economy would naturally place them.' Mr. Vigors then goes on to observe that the *Pari*, which thus introduce us into the present family, lead on to the more typical groups of the Linnean *Pipræ*, with which they bear an acknowledged affinity in manners and general appearance. He thinks that the genus *Pardalotus*, Vieill., which is the representative of the latter group in Australasia, appears to connect these two allied groups of the Old and New World, by exhibiting the nearly divided foot of the one and the partially curved bill of the other. Here Mr. Vigors is of opinion that *Rupicola*, Briss., and *Phibalura*, Vieillot, come in: and here, as he had already observed when speaking of the *Thrushes*, he apprehends that all those groups will be found to assemble, which, connected with *Ampelis*, Linn., are generally denominated *Berry-eaters* and *Chatterers;* such as *Bombycilla*, Briss., the true *Ampelis* of authors, *Casmarhynchus*, Temm., and *Procnias*, Ill. To these the genus *Querula* of Vieillot may, he thinks, be added. 'This group,' says Mr. Vigors in conclusion, 'the type of which is the *Muscicapa rubricollis* of Gmelin, is strongly allied by its bill to the foregoing genera, while its habits equally ally it to the family of *Muscicapidæ*, which follows. The interval between the present groups and those of the *Pari*, where we entered on the family, appears to be filled up by a race of birds peculiar to New Holland, and hitherto uncharacterised, of which the *Muscicapa pectoralis*, Lath., is the type. These, uniting many external characters at least, both of the *Berry-eaters* and *Flycatchers*, exhibit also in general appearance a considerable resemblance to the *Pari*, and will be found, I conjecture, to be the connecting bond between all these groups. The affinity between this last family of the tribe and the *Muscicapidæ*, which first met our attention as we entered it, has already been observed, when I spoke of the separation of the broad-billed *Chatterers* from the *Thrushes:* and thus, equally as in the former tribe, we may recognise the completion of a circular succession of affinities between all the families of the *Dentirostres*.'

M. Lesson, who adopts Mr. Vigors's family, makes the *Pipridæ* consist of the genera *Rupicola* and *Calyptomena* (which will be treated of in this work under the title RUPICOLINÆ), *Pipra*, *Pardalotus*, and *Pachycephala*.

Mr. Swainson does not admit the family *Pipridæ*, but he makes the *Piprinæ* a subfamily of the *Ampelidæ*. [PIPRINÆ.]

PIPRI'NÆ, Mr. Swainson's name for the *Manakins*, which he makes a subfamily of the family *Ampelidæ*, *Fruit-eaters* or *Chatterers*, and thus characterises:—

Size small. Feet lengthened, slender, weak. Bill very short: the upper mandible much curved.

Mr. Swainson is of opinion that the *Piprinæ*, called *manakins* from their diminutive size, which is seldom larger than that of a tom-tit, constitute the subtypical group of this family. 'Here again,' says Mr. Swainson, 'we find the richest tints of yellow, orange, crimson, and blue, relieving the olive-green or deep-black plumage of these elegant little birds. They are strictly American,* and chiefly occur in the deep virgin forests of the tropics, but they are much more social than the *Cotingas*. They live in little bands, are continually in motion, and feed almost entirely on the large soft berries of the different species of *Melastoma*. The nest of one species, *P. pareola*, is often built in the fork of a shrub, in such an exposed manner that the female can look all round and watch the approach of danger; we found one in such a situation in the forest of Pitanga, a single leaf of a large pepper-plant (*Piper*) forming a kind of umbrella shade over the female, which was sitting, and did not rise from her nest as we passed onward. The manakins are easily known by their weak and slender feet, of which the two outer toes are considerably united. By that singular little bird *Calyptura cristata*, the genus *Pipra* is united to that of *Pardalotus*, Vieill., or the spotted manakins of New Holland. Of a size equally diminutive, these are, nevertheless, distinctly separated from the last by their stronger bill and more pointed wings, while the feet are stronger and perfectly formed, all the toes being divided. Lewin, in his *Birds of New South Wales*, when describing one species, remarks, that it frequents high forest trees, constantly singing a short but pleasing song in passing from tree to tree. This genus, in all probability, represents that of *Dicæum* among the honeysuckers, and *Euphonia* among the tanagers. The subgenus *Metopia* seems necessary to connect *Phœnicircus* with *Pipra;* and there are one or two birds evidently belonging to this division not yet described, which, by their stronger bill, evince a tendency towards uniting with *Leiothrix*.'

Phœnicircus, *Pipra* (with its subgenus *Metopia*), *Calyptura*, and *Pardalotus*, are the genera arranged by Mr. Swainson under this subfamily.

Phœnicircus. (Sw.)

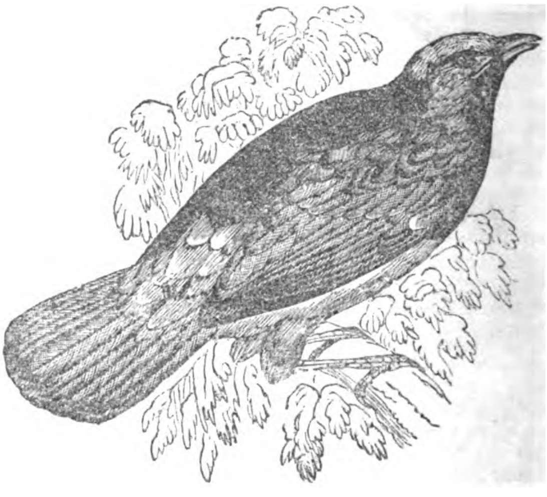
Generic Character.—Size and habit of *Ampelis*. *Bill* small, rather weak. Wings very short, convex, rounded: the three first *quills* narrow, and of equal length; the fourth much shorter, and ending in a point. *Tail* broad, even. *Feet* short, strong; *toes* syndactyle; *tarsi* feathered, on their inner side only, as far as the toes; *claws* strong, curved. (Sw.)

Example, *Phœnicircus Carnifex*. (*Ampelis Carnifex*, Linn.)

Description.—Fire-red, with a bright red cap; back red-brown; breast blood-red; tail-feathers purple, terminated by ruddy-black. *Female* reddish; abdomen ochraceous; front reddish.

The Caraibs designate this magnificent bird by the names *Arara* and *Apira*.

Localities.—Brazil, Guiana, Surinam.



Phœnicircus Carnifex.

Pipra. (Linn.)

Generic Character.—Size very small. *Bill* weak: the upper mandible bent over the lower, which is flattened and nearly straight; notch small. *Wings* more or less rounded. *Tail* short, even. *Toes* syndactyle.

Examples, *Pipra strigilata*, and *Pipra Aureola*.

Description of Pipra strigilata.—(*Male.*)—Size of a wren; a patch or cap of fire-colour covers the head; all the upper part of the body uniform grass-green; all the lower parts yellow striated with brown; bill brownish; feet yellowish.

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* But see *Pardalotus*, post, p. 179.

Female.—Not differing from the male, except in the absence of the red cap on the head.

Locality.—Brazil.

Description of Pipra Aureola.—Red; back, wings, and tail black; throat yellow.

Locality.—Guiana.

Pipra Aureola.

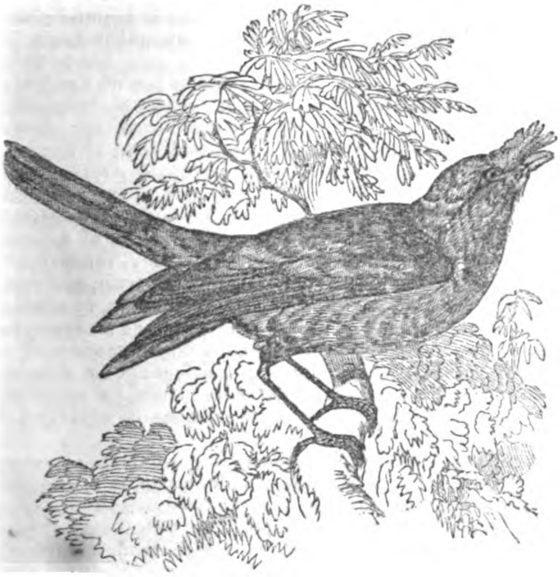
Metopia. (Sw.)

Generic Character.—*Front* with an elevated compressed crest. *Wings* lengthened, very broad. *Tail* broad, lengthened, rounded. (Sw.)

Example, *Metopia galeata.* (*Pipra galeata*, Licht.)

Description.—Black. Frontal crest, directed forwards over the culmen of the bill, rich crimson, which colour is also continued over the head and back of the neck; feet and legs reddish brown.

Locality.—Brazil.



Metopia Galeata.

Calyptura. (Sw.)

Generic Character.—*Bill* short, strong, robust, shrike-like; the sides somewhat gibbous; the notch deep and tooth-like. Under mandible strong. *Wings* short, rounded. *Tail* remarkably small, almost concealed. *Feet* lengthened, slender, toes syndactyle. (Sw.)

Example, *Calyptura cristata.*

Description.—Crown red; upper parts brownish or olivaceous green; rump yellow; throat and breast yellowish; abdomen brighter yellow; feet and legs black.

N.B. The hidden part of the feathers is obscure lead-colour, the ends of them only giving the prevailing colour. When the plumage is blown aside or disturbed, the lead-colour appears.

Locality.—Brazil.

Calyptura Cristata.

Pardalotus. (Vieill.)

Generic Character.—*Bill* as in *Calyptura.* *Wings* long, pointed; the three first quills of equal length. *Tail* short, even. *Feet* strong; lateral toes free and equal. (Sw.)

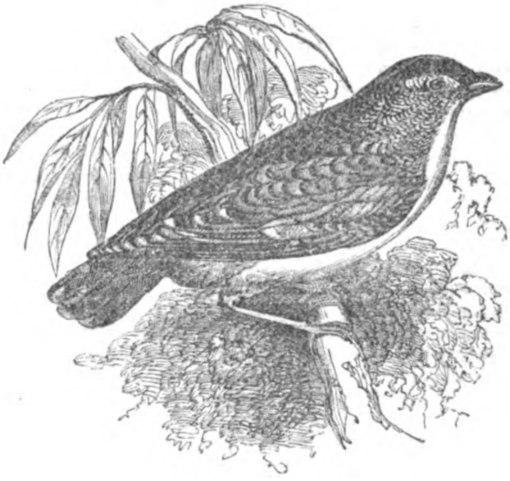
Example, *Pardalotus punctatus.*

Description.—(*Male.*)—Grey above, undulated with yellow; head and wings black, dotted with white; a white line above the eye; rump fire-red; abdomen whitish; throat yellow.

The *female* has the head dotted with yellow points.

Locality.—Australia.

Habits, &c.—Mr. Caley states that this species is called *Diamond Bird* by the settlers, from the spots on its body. He adds that it is reckoned a valuable bird on account of its skin, that it is not very plentifully met with, and that it inhabits both forest-land and brushes, at least he had seen it in both. (*Description of the Australian Birds in the Collection of the Linnæan Society*, Vigors and Horsfield, in *Linn. Trans.*, vol. xv.)



Pardalotus punctatus.

Mr. G. R. Gray makes the *Piprinæ* the second subfamily of the *Ampelidæ*, *Pachycephalinæ* being the first; and he arranges under it the following genera:—

1. *Phœnicircus*, Sw. (*Pipra*, Wagl., *Ampelis*, Linn., *Querula*, Cuv.). 2. *Metopia*, Sw. (*Pipra*, Licht.) 3. *Pipreola*, Sw. 4. *Pipra*, Linn. (*Manacus*, Briss.). 5. *Pipracidea*, Sw. 6. *Iodopleura*, Sw. (*Pardalotus*, Less.). 7. *Calyptura*, Sw. (*Pardalotus*, Vieill., *Regulus*, Licht.).

PIQUET, a corps of troops detached from the main body of an army, when in position or in cantonments, and disposed about it in parties so as to form a chain of outposts for its security.

As an army depends for its safety upon timely notice being obtained of the movements of the enemy, in order that it may prepare itself to repel an attack, it is of the utmost importance that the advanced posts should be disposed in such a manner that they may mutually support one another, and that none of them may be cut off by parties of the enemy passing unobserved between them. The chain must of course entirely surround the position, unless the latter should in any part be secured by rivers or by some other obstacles which it may be impossible for the enemy to pass or turn. The nature of the ground determines the class of troops which should be employed; but in general both cavalry and light infantry are appointed together for the outpost duty. In an open country the former may be numerous, but in one much enclosed or abounding with obstructions, the latter alone can act efficiently.

In the French service, the term *piquet* is applied not to the whole corps of troops at the outposts, but to the particular bodies of cavalry or infantry, from 100 to 500 strong, which are stationed at intervals from each other at about half a league from the army which they cover. Detachments from these, constituting what are called the main guards or rallying posts, and varying in strength from 20 to 100 men, are sent forward about half a mile further; and at about an equal distance beyond them are established posts of observation, consisting of parties of from 5 to 20 men. From the last are sent out the vedettes, as they are called, if of cavalry, or the sentinels, if of infantry, in the proportion of one man for every four or five of their number; and these, who are placed at the distance of 200 or 300 yards in advance of the posts of observation, constitute the outer circumference of the chain.

A nearly similar method of forming the chain of advanced posts is followed by the armies of all nations, when in the field; and it is evident that, by such a system, any movement of the enemy must be known in time to allow the necessary measures to be taken for frustrating its object.

The several corps or parties of troops employed on piquet duty are commonly posted on elevated and advanced points of ground, in order that they may be able to observe the enemy; and particularly that they may command the roads or passes by which he may advance towards the position occupied by the army. They generally take possession of villages or isolated buildings, if such there be; otherwise, when liable to be annoyed by the enemy's parties, they obtain cover from walls or embankments, or from small breastworks thrown up for the purpose. The lines of approach to the position should be blocked up by abatis, or intersected by trenches, so that the progress along them may be impeded; and some of them should, if possible, be rendered entirely impassable, in order to diminish the number of points to be guarded. The advanced corps should also have the means of succouring each other when necessary, and of retiring when in danger of being overpowered: for these purposes they are placed where the ground is favourable for communication or retreat. If for any reason a party should be stationed where this is not the case, routes must be formed by levelling walls, cutting openings through woods, laying bridges over streams, or by any other method which may be found convenient.

The outlying vedettes or sentries should be placed in situations where they may be able to see all the ground from one to another; and patroles of cavalry should be constantly moving between these and the interior posts. It may be added that patroles intended to act offensively are frequently employed in reconnoitring the ground leading to the enemy's position, in endeavouring to surprise his sentinels, or in skirmishing with the troops in his outposts.

The principal corps which form the chain are expected to defend for a time the posts which they occupy; and, on this account, they are frequently provided with a certain number of pieces of artillery, which they so dispose, under cover of an epaulement, that the fire may be directed along the line by which the enemy must advance. The smaller parties however are instructed to resist no longer than may be necessary to enable them to ascertain the force of the enemy and the direction in which he is moving. Concerning these points, notice must immediately be sent to the nearest officer in command of the outposts; for which purpose, and also for the general transmission of orders or reports, a certain number of dragoons are joined to each post of infantry. On establishing the chain, the several parties or individuals should be informed at what particular points they are to rally in the event of being driven in, and by what routes they are to arrive at those points.

At night the outlying parties are generally reinforced, or are made to take less advanced positions; and other parties are always kept in readiness to increase their strength still further if necessary. In the event of an enemy appearing, the sentinels, having given the alarm by discharging their muskets, retreat to the nearest posts; and these, if compelled, retire to the main guards, continually skirmishing with the enemy in order to retard his progress, yet taking care to avoid being cut off. By the delay thus occasioned, time is afforded for ascertaining the force of the enemy, and, if necessary, for drawing out the army in order of battle to receive his attack.

PIRACY, PIRATE (immediately from the Latin *pirata*, and remotely from the Greek *πειρατής*, which had the same signification as our word pirate). The crime of piracy, or robbery and depredation on the high seas, is an offence against the universal law of society; a pirate being, as Blackstone expresses it, 'hostis humani generis' (4 Bl., 70). 'With professed pirates,' Lord Stowell observes (2 Dods., 244), 'there is no state of peace. They are the enemies of every country, and at all times; and therefore are universally subject to the extreme rights of war.'

Molloy, an antient writer on maritime law, but whose doctrine it would be dangerous to adopt in these days, says, 'If a piracy be attempted on the ocean and the pirates are overcome, the captors may immediately punish them with death, and not be obliged to bring them into any port, provided this occurs in places where no legal judgment can be obtained. So likewise if a ship be assaulted by pirates, and in the attempt they are subdued and taken, and carried into the next port, if the judge openly rejects their trial, or the captors cannot wait till judgment shall be given without certain peril and loss, they may do justice on them themselves without further delay or attendance.' (Molloy, *De Jure Maritimo*, chap. iv., sect. 12, 13.)

'There is said to be a fashion in crimes; and piracy, at least in its simple and original form, is no longer in vogue. There was a time when the spirit of buccaneering approached in some degree to the spirit of chivalry in point of adventure; and the practice of it, particularly with respect to the commerce and navigation and coasts of the Spanish American colonies, was thought to reflect no dishonour upon distinguished Englishmen who engaged in it. The grave judge (Scaliger) observes, in a strain rather of doubtful compliment, "Nulli melius piraticam exercent quàm Angli."' (Lord Stowell, 2 Dods., 374.)

The offence of piracy, by the common law of England, consists in committing those acts of robbery and depredation upon the high seas, which, if committed upon land, would have amounted to felony there. (4 Black., 72.)

By statute some other offences are made piracy, as by stat. 11 and 12 Will. III., c. 7, if any natural-born subject commits any act of hostility upon the high seas against others of his majesty's subjects, under colour of a commission from any foreign power, or if any commander or other sea-faring person shall betray his trust, and run away with any ship, boat, ordnance, ammunition, or goods; or if he yields them up voluntarily to a pirate, or conspires to do these acts; or if any person assaults the commander of a vessel to hinder him from fighting in defence of his ship, or confines him, or makes or endeavours to make a revolt on board, he shall for each of these offences be adjudged a pirate.

By the stat. 8 Geo. I., c. 24, the trading with known pirates, or furnishing them with stores or ammunition, or fitting out any vessel for that purpose, or in anywise consulting, combining, confederating, or corresponding with them; or the forcibly boarding any merchant vessel, though without seizing or carrying her off, and destroying or throwing any of the goods overboard, shall be deemed piracy. (See further on this point, 4 Blacks., 72, 269; and Abbott, *On Shipping*, 140, 141, 142, 239.) Lastly, the stat. 5 Geo. IV., c. 113, sec. 9, makes the dealing in slaves on the high seas by any of his majesty's subjects piracy, and subjects the guilty party to the penalty of death.

Persons guilty of piracy were formerly tried before the judge of the admiralty court according to the rules of the civil law, but this was altered by the stat. 28 Henry VIII., c. 15, which enacted that the trial should be before commissioners of oyer and terminer, and that the course of the proceedings should be according to the law of the land. Further provision was made with respect to the trial of offences on the high seas by the statutes 39 Geo. III., c. 15; 43 Geo. III., c. 113; 46 Geo. III., c. 54; and now, by the stat. 4 and 5 Will. IV., c. 36, sec. 22, the trial of offences committed on the high seas is in the Central Criminal Court.

PIRÆUS. [ATHENS.]

PIRANE'SI, GIOVANNI BATTISTA, born at Venice, in 1720, was one of the most distinguished artists of the last century, and in his own peculiar walk unrivalled. At the age of eighteen, he was sent by his father (who was a mason) to study architecture at Rome; to which he devoted himself with such enthusiasm as to thwart his parent's intentions, for on being summoned to return home, he refused, observing that Rome with its monuments was the adopted land of his affections—the birth-place of his talent. On this, his father withdrew his allowance, but instead of being tamed into submission, or at all discouraged, the young artist soon after (in 1741) brought out his first work on triumphal arches, bridges, and other architectural remains of antiquity. This production instantly established his reputation, the engravings being treated with such mastery, and being altogether so decidedly superior to any former representations of similar subjects, as to make an epoch in chalcography and architectural delineation; which latter had till then been almost uniformly very coarse, tasteless, and insipid, and nowhere more so than in Italy itself. With occasional exaggeration of chiaroscuro and effect, there is great vigour of execution in Piranesi's productions, which may partly be ascribed to his singular manner of working, it being his usual practice to draw his subject at once upon the plate itself, and complete it almost entirely by etching in aquafortis, with very little assistance from the graver. Hence his works are marked by a freedom and spirit that can otherwise hardly be preserved. The same circumstance also accounts for that astonishing rapidity of execution which enabled him to produce, within less than forty years, about two thousand engravings, most of them of very large dimensions and full of detail.

It is true he was not wholly without help from other hands, for all his children (three sons and two daughters) were brought up by him to assist him in his labours; and he had likewise several pupils, among others Piroli, a name of some note. Still such aid must have been comparatively inconsiderable, since it is evident from the peculiar manner and spirit which pervade his works, and which have never been caught by any of his scholars, that all his plates must have been executed chiefly by his own hand. The following is a list of his principal works:—'Architectura Romana,' 208 plates, 4 vols., atlas folio; 'Fasti Consulares Triumphalesque Romanorum;' 'Antichita d'Albano,' 35 plates; 'Campus Martius,' &c., 54 plates; 'Magnificenza dei Romani,' 44 plates; 'Vedute di Roma,' 2 vols., 130 plates of modern buildings at Rome; 'Collection of Candelabra, Vases,' &c.; 'Collection of Chimney-pieces,' a series of most splendid designs; 'Carceri d'Invenzione,' 16 plates, filled with exceedingly wild but most picturesque conceptions; 'A Collection of Antient Statues and Busts,' 350 subjects; 'The Trajan and Antonine Columns;' 'Antiquities of Herculaneum and Pompeii.' A complete set of his works (comprising many not here enumerated) amounts to no fewer than twenty-nine folio volumes, many of which are of unusually large dimensions, some of them being on double elephant paper, and the plates opening to ten feet in length. Their contents afford an almost inexhaustible mine of antiquity, both as regards architecture and sculpture; and indeed his 'Magnificenza' alone, containing as it does many specimens and fragments of antient architecture till then little known, and so different from the usual routine examples of the orders, would alone have sufficed for his fame. Several of these, and other specimens of antient art engraved by him, such as vases, candelabra, &c., have been since copied in later works, yet even where they have been correctly and tastefully delineated, they are immeasurably inferior to the same subjects as touched by Piranesi.

In addition to his other numerous and extensive labours, he executed one or two of the plates in the 'Works' of Robert Adam, the English architect, where their superiority to the rest manifests itself very strongly. Piranesi did not execute much as a practical architect: the wonder is, that he should have found time to accept any professional engagements of the kind. Nevertheless he did so, and among the churches which he was employed by Clement XIII. to repair or rebuild, are those of Santa Maria del Popolo and the priory of Malta. It is in this last-mentioned edifice that a monument by Angolini, a life-sized statue of him, has been erected to his memory; an engraving from which is contained in the second volume of the 'Library of the Fine Arts,' a publication containing many valuable papers, and to which we are indebted for some of the particulars above given. Piranesi died at Rome, November 9, 1778.

PIRATE. [PIRACY.]

PIRE'NA. [MELANIANS; MELANOPSIS, vol. xv, pp. 76, 77.]

PIRIME'LA, Dr. Leach's name for a genus of *Crabs*, placed by M. Milne Edwards among the *Canceriens Arqués*, or those crabs which have no clypeiform prolongation on the sides of the carapace, which is much wider than it is long, arched in front, and strongly truncated on each side posteriorly.

M. Milne Edwards observes, in common with most other writers on the *Crustacea*, that the general form of *Pirimela* differs but little from that of many *Cancerians;* but he adds, that in other points it is far separated from them.

Carapace regularly arched on its anterior moiety, and strongly truncated on each side of its posterior moiety; much wider than it is long; convex, and strongly bossed. The *front* narrow and armed with three pointed teeth. The latero-anterior borders are directed very obliquely backwards and outwards, and are armed with four compressed and triangular teeth. The *orbits* present two teeth and two fissures above, a sharp tooth at the external angle, and a fourth at the internal and inferior angle. The *internal antennæ* are bent back longitudinally, as in the *Platycarcini.* The *external antennæ* are very long, but their first joint, which is lodged in a gap of the orbitary angle, is very short, and is not prolonged nearly so far as the basilary joint of the internal antenna; the moveable stem of these appendages springs consequently in the internal orbitary canthus, as in *Xantho,* &c. The *external jaw-feet,* instead of fitting into the buccal frame, as in all the preceding genera (according to the arrangement of M. Milne Edwards), advance upon the *epistome,* and instead of carrying the succeeding joint at the anterior and internal angle of their third joint, they give insertion to it towards the anterior third of that joint. The *sternal plastron* presents the same disposition as in the *Crabs,* &c.; its length only exceeds its width by one half, and its median suture occupies its three last segments. The anterior feet are small and compressed; the succeeding feet present nothing remarkable. The abdomen of the male is only composed of five joints.

Example, *Pirimela denticulata.*

Description.—Carapace smooth, but strongly bossed on the stomachal, genital, and branchial regions, and concave on the hepatic regions; latero-anterior borders delicate and not reaching beyond the level of the middle of the genital region. Pincers furnished with a small crest above, and with one or two carinated lines on their external surface. Length about six lines; colour greenish.

Localities.—Coasts of Europe, England and France

Pirimela denticulata.

PIRMASENS is a well-built fortified town in the Bavarian province of the Rhine. It was a place of small importance till Lewis IX., landgrave of Hesse-Darmstadt, chose it for his residence. In his time it had 9000 inhabitants; but he died in 1790, and the wars of the French revolution soon afterwards breaking out, the town greatly declined, and after having several times changed masters in the various cessions of territory that ensued, was at length annexed to Bavaria. It has now about 5000 inhabitants. The palace, the town-hall, the Lutheran school, and the Lutheran and Calvinist churches are accounted handsome buildings. There is also a large building for exercising troops in bad weather. There are some vinegar-manufactories, and musical instruments are made. In the year 1793 the duke of Brunswick obtained an advantage over the French near this town. Pirmasens is 13 miles east-south-east of Deux Ponts, and 35 west of Spire.

PIRNA, a town in the circle of Meissen, in the kingdom of Saxony, situated in a beautiful part of the country on the left bank of the Elbe, 9 miles south-east of Dresden. Most of the houses are built of stone from the celebrated quarries near the town. The principal public buildings are the town-hall, the great church, which is one of the finest specimens of Gothic architecture in the kingdom, with painted glass windows, and the convent church, which belonged to the Dominican convent founded in 1301. The lyceum has been converted into a school. A Roman Catholic school was founded in 1822, and the Roman Catholic church of St. Kunigunda was consecrated in 1823. An admirable orphan asylum was founded in 1813; and in 1830 a new school-house was built, which is one of the handsomest edifices of the kind in Saxony. On a high rock near the town, called the Sonnenstein, there was formerly a strong fortress, which was dismantled by the Prussians in the Seven Years' war. It was afterwards fitted up as a lunatic asylum, but in 1813 Napoleon expelled the patients, and again fortified it. However the establishment was restored in 1814, on an admirable plan, which may serve as a model for similar institutions. There are flourishing manufactures of cotton, linen, woollen cloths, stockings, hats, leather, ironmongery, starch, &c. Calico-printing is carried on to a great extent. The inhabitants have a considerable trade in their own manufactures, and in the natural productions of the country, among which the Pirna sandstone holds an important place. There are numerous quarries in the adjacent country, which furnish three sorts of stone; the first is best suited for grindstones, the second for millstones, and the third for the use of the sculptor and statuary: the last is exported to England. Pirna has 5560 inhabitants. (Hassel, *Handbuch;* Stein, *Geographisches Lexicon;* Engelhardt, *Das Königreich Sachsen*, seventh edition, by W. E. A. v. Schlieben.)

PIRO'N, ALEXIS, born at Dijon, in 1689, studied the law, took his degrees, and practised as an advocate in his native town, but he afterwards forsook the bar, and lived for a time in gay and dissipated society. Being distressed in his circumstances, he repaired to Paris, and employed himself as a copyist, and afterwards wrote for the stage. He produced several light comedies and farces, which succeeded very well, but he failed in his attempt to write tragedy. At fifty years of age he composed his drama 'La Métromanie,' the best of his works, which established his reputation as a writer. He had been himself in his youth seized by a kind of mania for writing verse, and was therefore a competent judge on the subject. Piron had much ready wit and a great facility for repartee, and his epigrams were very celebrated in his time. He wrote also Tales, Odes, and other light poetry, most of them grossly licentious, according to the prevailing taste of his age, which was that of the reign of Louis XV. He may be considered as a representative of his time and country, witty, thoughtless, and licentious. He had however some attractive personal qualities, and he found friends among a higher order of men. Montesquieu obtained for Piron a pension from the king of 1000 livres; the count of Livry, Maurepas, the duke of Nevers, and other noblemen also patronised him. He married at a mature age a woman of mature years, and lived very happy with her till her death. Piron's sight was very weak, and a fall which he had in the park of the count of Livry hastened his death in 1773. His works were collected without discrimination, and published by Rigoley de Juvigny, 7 vols. 8vo. Piron however, before his death, had expressed his regret at the publication of some of his more obscene odes, which had proved a bar to his being received among the members of the Académie Française, an honour which he had sought, although he affected to disdain it in his writings. The following is his epitaph, written by himself:—

'Ci gît Piron, qui ne fut rien
Pas même Académicien.

PISA. The *Compartimento* or *Province of Pisa*, one of the administrative divisions of Tuscany, is bounded on the north by the duchy of Lucca, on the east by the province of Florence, on the west by the sea, and on the south by the Compartimento of Grosseto, which has been detached from the province of Siena. [SIENA.] The province of Pisa comprises: 1, The lower part of the basin of the Arno, with a small part of that of the Serchio. 2, A hilly range, called Montenero, or Monti Livornesi, which bounds the basin of the Arno on the south, and runs close to the sea south-east of Livorno. 3, The basin of the Cecina, south of the hills just mentioned. The river Cecina rises in the range of high lands, between 1000 and 1500 feet high, which divides the Maremma, or maritime lowlands, from the valley of the Ombrone in the province of Siena, and, after a tortuous course of about 40 miles in a western direction, enters the sea by two mouths in the gulf of Vada, 22 miles south-east of Livorno. 4, A strip of land south of the mouths of the Cecina, and extending along the sea-coast and between that and the hills for about 12 miles, as far as the Torre S. Vincenzo. South of this point is the district of Piombino, which formerly made part of the province of Pisa, but has of late years been annexed to the Compartimento of Grosseto. To the east of Piombino is the district of Campiglia, in the valley of the Cornia, which has likewise been detached from Pisa and annexed to Grosseto. 5, The island of Elba, which is attached to the administrative province of Pisa. 6, Several detached districts, or 'enclaves,' as the French style them, situated to the north between the territories of Lucca, Modena, and Parma, but which belonged of old to the grand-duchy of Tuscany, and are appurtenances to the administrative province of Pisa. These divisions are: Barga, in the valley of the upper Serchio, between the states of Lucca and Modena [GARFAGNANA]; Bagnone and Fivizzano, in the valley of the Aulella, an affluent of the Magra at the foot of the Apennines, in the region called Lunigiana, which is now divided between Modena, Tuscany, and Sardinia [MODENA, DUCHY OF]; Pontremoli, still farther north, near the sources of the Magra, and at the foot of the Apennines of La Cisa, which divide it from the valley of the Taro in the state of Parma. Pontremoli is a small town with a castle, which is mentioned in the history of the middle ages as commanding an important pass from the plain of Lombardy to the shores of the Mediterranean. A road leads from Parma by Pontremoli to Sarzana. Lastly, the district of Pietrasanta, which lies along the sea-coast between the territories of Lucca and of Massa and Carrara, belongs also to the province of Pisa. It stretches from the sea to the foot of the Carrara Mountains, or Alpe Apuana, and is chiefly noted for its marble quarries at Serravezza, which are of the same description as those of Carrara. The area of the whole province of Pisa is about 1350 square miles, and the population in 1835 was 326,570. (Serristori, *Statistica d' Italia.*) It is divided into 15 districts, containing in all 53 communes. The districts are: Pisa, Livorno, Rosignano, Guardistallo, Pomarance, Peccioli, Pontedera, Lari, Vico Pisano, Barga, Bagnone, Fivizzano, Pontremoli, Pietrasanta, and Portoferrajo, or Elba. The principal towns are: PISA, LIVORNO, and Portoferrajo. [ELBA.]

PISA, one of the principal towns of Tuscany, and the handsomest next to Florence, is situated in a plain, through which flows the Arno, forty-five miles west of Florence, thirteen miles north by east of Livorno, and about four miles from the sea-coast. The town is divided by the river into two nearly equal parts, connected by three bridges, one of which is of marble. The circumference of the walls is about six miles; the quays along the Arno and several other streets are wide, well-paved, and lined with handsome buildings, but the town has an appearance of loneliness, and the grass grows in many of the streets. The population, which once exceeded 100,000, is now hardly 20,000. The four most remarkable buildings of Pisa, the cathedral, baptistery, belfry, and Campo Santo, are grouped near one another in a vast open place at the western extremity of the town. The duomo, or cathedral, begun in the eleventh century, is a splendid Gothic structure, cased externally with marble of various colours, and ornamented with numerous relievos, inscriptions, and columns of various sizes, put together without much taste. The interior of the church is rather dark, the light coming in through small windows of painted glass; the nave is divided from the rest of the church by fine columns of granite; and the three bronze gates of the façade are ornamented with figures.

The dome is one of the earliest constructions of the kind among the churches of Italy, though posterior to those of S. Vitale at Ravenna and St. Mark at Venice. The pulpit is enriched with valuable sculptures by Giovanni di Pisa; other statues and sculptures by the same, and by Giovanni da Bologna and other artists, are in various parts of the church. The paintings are by Andrea del Sarto, Razzi, called Il Sodoma, Salimbeni, Salvator Rosa, Roselli, Luti, Sorri, Riminaldi, Sogliani, and other masters. The pavement is of marble of various colours This magnificent temple was erected by the architect and mechanician Buschetto and his successor Rainaldo.

The baptistery, detached from the church, is round, and entirely cased with marble. It was built about the middle of the twelfth century, by the architect Diotisalvi of Pisa. It is ornamented by numerous sculptures; the pulpit in particular is considered a masterpiece of Nicola Pisano. [BAPTISTERY.]

The belfry is a round tower, likewise cased with marble, 190 feet high, which deviates from the perpendicular line about fourteen feet. It was erected in the latter part of the twelfth century, by the architects William of Innspruck and Bonanno of Pisa. From the summit there is a splendid view of the plain, the surrounding mountains, and the sea.

The Campo Santo, or cemetery, constructed in the thirteenth century, by Giovanni di Pisa, is a long parallelogram, 430 feet in length, with an arcade or cloister running all round the interior, the walls of which are covered with fresco paintings, chiefly by Giotto, Orgagna, and Memmi. The paintings are for the most part greatly damaged, and some are entirely obliterated. [NICOLA DI PISA.] A series of engravings of the paintings has been published. (Rosini, *Pitture del Campo Santo di Pisa, con l'indicazione dei Monumenti di Belle Arti colà raccolti*, 1816.)

Several antient sculptures and other remains of antiquity are deposited in the Campo Santo. Among the tombs is that of the Countess Beatrice, the mother of Matilda, of Algarotti, Pignotti, and of the celebrated surgeon and professor Vacca, which last is the work of Thorwaldsen.

The other remarkable buildings of Pisa are—1, the church of S. Stefano, belonging to the military order of that name, which was founded in 1561, by the grand-duke Cosmo, for the purpose of crusading against the Barbary pirates; 2, that of S. Frediano, which is rich in paintings; 3, S. Nicola, with a handsome belfry, the work of Nicola Pisano; 4, S. Michele in Borgo contains the monument of Guido Grandi, a celebrated mathematician and antiquarian, and contemporary of Newton, whose MSS., in forty-four volumes, are in the university library; 5, S. Maria della Spina, a handsome church, with good paintings and sculptures. There are many other churches besides these. 6, The palaces of Lanfranchi and Lanfreducci; 7, the Torre della Fame, in which Ugolino and his children were starved to death; it now forms part of a structure called Palazzo dell' Orologio, on the Piazza dei Cavalieri; 8, the university buildings, the library, observatory, and botanical garden; 9, the great hospital; 10, the Loggia, or old Exchange.

The Certosa, or Carthusian convent and church, is in a pleasant situation, about two miles east of Pisa. The vast farm and forest of S. Roisore, belonging to the grand-duke, three miles from Pisa, near the sea, is chiefly remarkable for the camels, about eighty in number, the original stock of which were brought to this spot in the time of the Crusades. The mineral baths, called di S. Giuliano, four miles from Pisa, at the foot of a mountain, have been restored on the remains of antient thermæ, which were frequented in the middle ages by the countess Matilda. The present buildings are of the last century. They are not so much frequented as they used to be, people resorting in preference to the baths of Lucca, the situation of which is more agreeable and healthy, especially in summer, when the air of Pisa and the neighbouring plain is not considered wholesome, though it is not so deleterious as it once was, owing to the drainings that have been made, and the improvements effected in cultivation of late years. During the winter the climate of Pisa is extremely mild though rainy, and is well suited to persons with weak lungs.

History of Pisa.—The origin of Pisa was a matter of doubt even in the time of Cato, who acknowledged that he could not ascertain who were its original inhabitants before it came into the possession of the Etruscans. (Servius, x. 179.) Strabo and Pliny give it a Greek origin, and consider it to be a colony of Pisa in Elis, and Virgil (*Æneid*, x.) adopts the same tradition. Lycophron pretends that Pisa was taken by the Tyrrhenians from the original Ligurian inhabitants. Pisa was on the border between Etruria and the country of the Ligurians, and was probably colonised by the Etruscans when they extended their dominion from the Arno to the Macra. It is not reckoned among the twelve principal towns of the Etruscan confederation. It underwent the same vicissitudes as the rest of Etruria, and became subject to Rome about the middle of the fifth century of Rome, retaining, like most Etruscan towns, its municipal form of government. Livy (xl. 43) mentions that a Latin colony was sent to Pisa, at the request of the citizens, who offered a part of their territory to the colonists about 179 B.C. Nothing more is said concerning Pisa in Roman history, but we find that it had bishops at the beginning of the fourth century. Pisa passed successively under the dominion of the various conquerors of Italy, the Goths, the Longobards, and the Carlovingians. Under the last it governed itself, like most other Italian towns, as an independent community under a nominal allegiance to the emperors and their great feudatories the counts or marquises of Tuscany. In A.D. 874, the Pisans appeared in arms against the Saracen pirates from Africa, who were scouring the Mediterranean, and who, after having plundered the Roman coast, and made many prisoners, landed at S. Pietro in Grado, about three miles from Pisa. The Pisans attacked them by land whilst their galleys came out to cut off the retreat of the Saracens, who escaped, leaving their prisoners behind them, whom the Pisans restored to Rome. In the year 926, Hugo of Provence came to Pisa, where he received the homage of the great feudatories as king of Italy. In 965, Otho I., on his return from Rome, stopped at Pisa, and was so pleased with his reception that he granted various privileges to the town, and several noblemen of his retinue were so delighted with the country that they asked his leave to remain and settle there. This was the origin of seven noble families, which afterwards figured in the history of Pisa, namely, Casamatti, Orlandi, Ripafratti, Visconti, Verchionesi, Gusmani, and Duodi. From that time Pisa was considered one of the Italian cities most attached to the emperors. About A.D. 1003 the Pisans sent their galleys to the coast of Syria, against the Seljuk Turks, who had invaded the country, and who vexed the Christians of Palestine.

In the following year began the long struggle between Pisa and Muscet, the Moorish king of Sardinia, which ended in the final conquest of that island by the united Pisans and Genoese, in the year 1022, after which the Pisans divided Sardinia into four provinces, or giudicati, namely, Cagliari, Torre or Sassari, Arborea, and Gallura, to which they appointed giudici, or governors, from the principal families of Pisa, who in the course of time became nearly independent. At this period Pisa was a republic, having its annual consuls, but it appears that the bishop had also a considerable share in the administration. The territory of Pisa extended on the side of Florence as far as Empoli, and along the coast to the south-east as far as Piombino. Lucca bordered it on the north, and frequent dissensions arose between it and Pisa. The harbour of Pisa was formed by a bay which is now filled up, at a place called Calambrone. [ARNO.] In the year 1030, the Pisans sent a fleet of 50 galleys to Carthage (so say the chroniclers, but perhaps they mean Porto Favina), and took the town from the Saracens, and in 1038 they likewise took possession of the island of Lipari. In the year 1050, the Moors of Barbary again invaded Sardinia, but the Pisans sent a large armament, and drove them away. The Pisans at the same time subjected, at least in part, the island of Corsica, and in 1089 or 1091, Pope Urban II. made a grant to the Pisans of the whole island as a fief of the Apostolic See. (Tronci, *Memorie di Pisa.*) In 1062, Pisa sent assistance to Robert Guiscard, the Norman duke of Apulia, against the Saracens. In 1063, the Pisans sailed to Palermo, which was occupied by the Saracens, and, after a sharp engagement, they entered the harbour, and carried away the shipping, with a rich booty, part of which was employed in building their splendid cathedral. The Pisans however did not retain possession of Palermo, which soon after fell, with the rest of Sicily, into the hands of the Normans. About the year 1070 began the wars between Genoa and Pisa, which continued, with various interruptions, for more than two centuries, and ended in the downfall of Pisa. Commercial jealousy, and the possession of Corsica, which the Genoese aimed at, were the causes of the war. The respective claims of the Genoese and Pisans upon Corsica have been a matter of much historical controversy. (Tanucci, *Dissertazione del Dominio Antico dei Pisani sulla Corsica;* Flaminio del Borgo, *Dissertazioni Pisane; Note* agli 'Annali Genovesi' di Caffaro; Manno, *Istoria della Sardegna.*) In 1088, the two states, having made peace, joined their fleets, and, sailing to the coast of Barbary, took the town of Mahadiah, which is also called Africa by the chroniclers, on the eastern coast of Tunis, and which was then the capital of a considerable Saracen state. They obliged the king to pay a large sum of money, to release all his Christian slaves, and to promise never more to cruise with his privateers in the Italian seas. About this time the Countess Matilda made several important donations of lands and castles to the see of Pisa, the diplomas of which are given by Tronci. Countess Beatrice, Matilda's mother, died at Pisa, and her cenotaph is still seen outside of the cathedral. Donizo, in his Life of Matilda, represents Pisa as a great and flourishing emporium, whither ships and merchants from all parts of the Mediterranean resorted:

> 'Qui pergit Pisas, videt illic monstra marina;
> Hæc urbs Paganis, Turchis, Lybicis, quoque Parthis
> Sordida; Caldæi sua lustrant littora tetri.'

It was in this period of their prosperity that the Pisans completed their splendid monuments of art, the cathedral, the belfry, baptistery, and Campo Santo. The Pisans sent a fleet of 120 sail to the first crusade, and their soldiers and sailors assisted at the taking of Nicæa, and afterwards at that of Antioch, as a reward for which they obtained a street of that city to establish a factory in. In 1099 the Pisans were at the taking of Jerusalem. In the following year they sailed into the sea of Marmara, and obliged the emperor Alexius to sign a treaty, by which he allowed them to establish a factory at Constantinople, with ample privileges. The Pisan fleet returned home in triumph, and their city was then entirely surrounded by walls.

In 1114, the Pisans sent a large armament, the largest that had ever sailed from their coast, to the conquest of the Balearic Islands, which were in possession of the Moors, and which had become a nest of Mohammedan pirates. The fleet consisted of 300 ships of various sizes, having on board 35,000 men and 900 horses. A great part of the troops consisted of mercenaries and also of contingents sent from the Pisan possessions in Sardinia. The archbishop of Pisa, Pietro Moriconi, himself commanded the expedition, of which we have an account in a curious Latin poem written by his own secretary, Laurentius Varnensis Diaconus, and published by Ughelli. Several of the descriptions in this poem bear so striking a resemblance to some in Tasso's 'Gerusalemme,' that suspicions have arisen that the Italian poet may have been acquainted with the MS. of the deacon. In April, 1117, the Pisans, in conjunction with Raymundo IV., count of Barcelona, accomplished the conquest of the Baleares, took the son of the Moorish king prisoner and brought him to Pisa, where he afterwards became a Christian. Unfortunately for the correct understanding of all those important transactions in the tenth, eleventh, and twelfth centuries, we have no history of Pisa properly speaking. Whilst Genoa, Venice, and Florence have had accomplished historians, Pisa has nothing but partial chronicles and detached memoirs, although numerous authentic documents must exist in the archives, from which a history of Pisa might be written. Pisa rose early to importance, but she also fell at an earlier period than her rivals, which may account for her history having been neglected.

In the year 1137, the Pisan fleet went to the coast of Naples to aid the pope and emperor against the Normans, and took the town of Amalfi, where it is reported that they found a copy of the Pandects, from which all other copies made in Italy were derived. This assertion however has been much controverted. (Fanucci, *Dissertazione Istorico-Critica sul Ritrovamento delle Pandette*, in his *Storia dei tre celebri Popoli Marittimi del' Italia*, Pisa, 1821.)

In the war between Frederic Barbarossa and the Lombard cities, Pisa sided with the emperor, and afterwards sent a fleet of fifty galleys to accompany him to the Levant on his crusade. In the following century the Pisans, as Guibelines, took the part of Frederic II. against the pope. In 1258, peace was made between Genoa and Pisa, through the mediation of Pope Alexander IV. In 1282 began the fourth war between Pisa and Genoa. Oberto Doria, the first naval officer of the age, commanded the Genoese. In the year 1284 he sailed out of Genoa direct for the port of Pisa with 58 galleys, and was joined off the rocky island of Meloria, which lies opposite Leghorn, by 30 more galleys, under Benedetto Zaccaria, which he ordered to conceal themselves behind the island. The Pisan fleet came out, having on board the flower of the fighting men of Pisa. The galley of Doria, supported by another Genoese galley, attacked and took the admiral ship of Pisa, which bore the great flag of the republic. At the same time the thirty galleys which lay concealed behind the island of Meloria appeared, and attacked the Pisans in flank and rear. The Pisans fought desperately till night, when a few only of their ships escaped into the harbour. They lost 3000 men killed or drowned, and 13,000 were carried prisoners to Genoa, where they were confined in chains, and where most of them died. Hence a proverb became current throughout Italy—'Those who want to see Pisa must go to Genoa.' The Genoese would have restored the prisoners, if Pisa had agreed to give up Sardinia to Genoa; but it is said that the prisoners themselves declared that they would not purchase freedom at such a price. The women of Pisa who went to Genoa to see their unfortunate husbands or brothers were told by the jailers that 'their countrymen were dying thirty or forty a-day, and their bodies were thrown into the sea, and that such would be the fate of all the Pisans.' In 1290, Conrad Doria attacked the Porto Pisano, destroyed its towers, and sunk ships filled with stones at the entrance. (Giov. Villani, *Cronaca*, b. vii., ch. 141.) From that time Pisa completely lost its rank as a maritime power, after a glorious career of four centuries, and Venice and Genoa were left alone to dispute for the naval supremacy in the Mediterranean.

In the meantime Pisa was distracted by domestic feuds. Florence, at the head of the Guelphs of Tuscany, assailed it by land, and in their distress the Pisans appointed as their captain-general, for ten years, Ugolino Count Gherardesca, a Guibeline feudal baron, but allied by marriage to the Guelphs. Ugolino acted as a tyrant. In order to keep himself in power, he favoured alternately Guelphs and Guibelines, while he proscribed the more independent leaders of both parties. He was opposed by the archbishop Ruggiero degli Ubaldini, a staunch Guibeline; and in 1288, being accused of betraying his country into the hands of the Guelphs of Florence and Lucca, an insurrection broke out against him, headed by the archbishop. Ugolino, being overpowered, was confined, with two of his sons and two of his grandsons, the latter mere boys, in a tower near the Arno, the key of which was entrusted to the archbishop, who after a short time threw it into the river, and left the wretched prisoners to die of hunger. This catastrophe has furnished Dante with the subject of one of his most powerful and appalling descriptions.

The Pisans then appointed Guido da Montefeltro their captain-general. He recovered by force the strongholds which Ugolino had put into the hands of the Guelphs of Florence and Lucca, and his troops, armed with crossbows, became the terror of Tuscany. Peace was made in 1293, and in 1299 Pisa made peace with Genoa also. Pisa continued attached to the Guibeline party, and at the death of the emperor Henry VII., in 1313, found herself exposed to the attack of all the Guelphs of Tuscany. The Pisans gave the chief command to Uguccione della Faggiuola, a captain of some renown, who took Lucca, in 1314, and afterwards defeated the Florentines in the battle of Montecatino. Uguccione however acted as a tyrant both to Lucca and Pisa, until an insurrection broke out simultaneously in both cities, in April, 1316. Pisa resumed its republican form of government, and in 1322 exiled fifteen of the Guibeline nobles, and made peace with the Guelphs. In the following year a general massacre of the Pisans took place in Sardinia, and the insurgents offered the island to Alfonso, the son of James II., king of Aragon. Pisa made a last effort to preserve Sardinia, but was obliged to give it up to the Aragonese, in 1326. In 1328 Castruccio Castracani, the great Guibeline leader, took Pisa by surprise, but his death soon after restored it to freedom. In 1341 the Pisans, who still retained much of their martial spirit, defeated the Florentines, and took possession of Lucca, and kept it till 1369, when the emperor Charles IV. obliged them to restore Lucca to its independence.

Pisa was now distracted by internal feuds between the democratic party, at the head of which was a merchant family of the name of Gambacorta, supported by Florence, and the Guibeline nobles and their adherents, whose party was called the Raspanti, and who were assisted by the Visconti lords of Milan. The Raspanti, having for a time the upper hand, exiled their antagonists, and began to annoy the Florentine merchants, who had settled at Pisa and in its port, as well at Livorno, which was already frequented as a port. Upon this the Florentines removed their counting-houses to Telamone, a port in the Maremma of Siena. Another revolution soon broke out at Pisa, and the party of the Gambacorta was restored; but Gian Galeazzo Visconti, duke of Milan, caused Pietro Gambacorta to be murdered by his own secretary Jacopo Appiano, who made himself master of Pisa, A.D. 1392. After the death of Jacopo, his son sold the city to Gian Galeazzo, in February, 1399, reserving to himself and his descendants the principality of Piombino. Pisa, as well as Genoa, Lucca, Siena, Perugia, and Bologna, was thus annexed to the dominions of the Visconti. At the death of Gian Galeazzo, in 1403, his natural son Gabriello Maria had Pisa for his share, but not feeling himself secure, he placed himself under the protection of Charles VI. of France, whose representative Marshal Boucicault had occupied Genoa, giving up to him Porto Pisano and Livorno. Boucicault thought of nothing but making the most of this piece of good luck. He sold Livorno to the Genoese for 26,000 golden ducats; and in 1405, he offered to sell Pisa to the Florentines for the sum of 400,000 florins, to be divided between him and Gabriello Maria. The Pisans however, being informed of this negotiation, rose against Gabriello Maria and his French auxiliaries, and obtained possession of the gates of their city, but they failed in their attack on the citadel. Boucicault then offered to give to the Florentines the citadel and the other strongholds which he had in the territory of Pisa for 206,000 florins, which the Florentines paid him, and were put in possession of the citadel, A.D. 1405. Gabriello Maria demanded his share of the purchase money, but Marshal Boucicault rid himself of his importunities by having him beheaded as a traitor to the French king.

The Florentines had the citadel of Pisa, but not the town, and the citizens soon retook the citadel also. They now asked peace of the Florentines, offering to repay them the money which they had paid to Boucicault, and in order to facilitate the negotiation, they recalled from exile Giovanni Gambacorta, whose family had always been favourable to the Florentine connection, and named him their captain-general. The Florentines however would hear of no proposal except the surrender of Pisa; but the citizens were not yet sunk so low as to yield to such a demand; they considered themselves the oldest republic of Tuscany, and they determined on resistance. The Florentines blockaded Pisa for about a year, and when the inhabitants were reduced to the greatest distress for want of provisions, Giovanni Gambacorta secretly treated with the Florentines, and agreed to open to them the gates for 50,000 florins and the country of Bagno, which he did on the night of the 8th November, 1406. Gino Capponi, the commissioner of Florence, behaved with great humanity; he maintained the strictest discipline among his troops, and he introduced into the town, together with his soldiers, a number of waggon-loads of bread which he distributed gratis to the famished inhabitants. But the pride of Pisa was too much hurt to be reconciled to the yoke. The principal families emigrated to Sardinia and Sicily, and most of the young men sought their fortune in the companies of mercenaries which were then scattered about Italy. Thus ended the career of Pisa as an independent state.

After eighty-eight years of Florentine dominion, when Charles VIII. of France came to Italy, in 1494, and showed himself hostile to Florence, the people of Pisa, headed by Simone Orlandi, rose in arms, drove away the Florentines, and restored their republican government under the protection of France. In 1499, after the French had left Italy, the Florentines besieged Pisa, but were repulsed, the women themselves assisting their townsmen in repairing the fortifications. In 1504 the Florentines resumed the siege, but they failed again. At last, in 1509, they formed a close blockade round the town, and Pisa was obliged to surrender through famine. A second emigration then took place, the wealthier families preferring exile to the loss of independence. Since that time Pisa has remained subject to Florence or to the rulers of Florence and of the rest of Tuscany.

The university of Pisa has been the chief means of maintaining some life in the town. It is divided into three faculties, theology, law, and medicine; it reckons among its professors several distinguished men, and is attended by about four hundred students. In 1839 Pisa was chosen for the place of a general assembly of men of science from all parts of Italy. Above 400 came, besides several foreigners. They were classed into six sections, each of which had its separate meetings. Memoirs were read, and prizes offered for the next annual assembly, which was appointed to take place at Turin in 1840.

PISA (Zoology). [MAIIDÆ, vol. xiv., p. 297.]

PISCES (the Fishes), the last constellation of the old zodiac. There is in the mythological stories (which are unworthy of note) a confusion between this constellation and Piscis Australis presently to be noticed. (See Grotius, in his notes on Aratus.) The constellation consists of two fishes linked by a string attached to their tails: they are not close together, the upper one being close to Andromeda, the lower one under the wing of Pegasus. The rectangular figure mentioned in PEGASUS will be a guide to the position of the two fishes: the line of α Andromedæ and γ Pegasi being parallel to the body of one fish, and that of γ Pegasi and α Pegasi to the body of the other.

The principal stars are as follows:—

Character. ( ) not in Bayer.	No. in Catalogue of		Magnitude.	Character. ( ) not in Bayer.	No. in Catalogue of		Magnitude.
	Flamsteed. (Piazzi.) [Bradley.]	Astron. Society.			Flamsteed. (Piazzi.) [Bradley.]	Astron. Society.	
	1	2738	7	ψ^2	79	113	6
(x^1)	2	2744	6	e	80	116	5
(x^2)	3	2746	6	ψ^3	81	120	6
β	4	2752	5	τ	83	126	5
A	5	2763	6	χ	84	127	5
γ	6	2777	4	φ	85	131	5
b	7	2784	5½	ζ	86	132	5
κ	8	2798	5		87	133	7
	9	2799	6¾		88	135	6½
e	10	2801	5	f	89	139	6
(w^1)	11	2804	6	υ	90	140	5
(w^2)	12	2806	6	l	91	142	6
(w^3)	13	2808	6	ρ	93	150	5
(w^4)	14	2812	6		94	153	5
	15	2815	6		95	156	7
	16	2817	6		96	159	6½
ι	17	2823	6		97	160	6½
λ	18	2829	5	μ	98	162	5
(m)	19	2838	5	η	99	166	4
(n)	20	2841	5½		100	170	6
	21	2845	6		101	172	6
	22	2852	6	π	102	178	5
	23	2854	6		104	180	6½
	24	2857	6		105	181	6½
	25	2858	6	ν	106	184	5
	26	2860	6		107*	186	6
(p)	27	2864	5		109	187	6½
ω	28	2865	5	o	110	189	5
(q)	29	2869	5	ξ	111	200	6
(r)	30	2870	5		112	215	6½
c^1	31	2872	6	α	113	218	3
c^2	32	2873	5½		(8)	128	7
(S)	33	2877	5		(33)	19	6½
(E^1)	34	7	6		(68)	2792	6½
(B)	35	16	6		(84)	157	7
	36	17	6		(85)	158	7
	40	22	6		(96)	2805	7
d	41	23	6		(107)	168	7
(t)	44	28	6		(110)	169	6
	45	29	6		(110)	47	7
	47	33	6		(115)	49	6½
	48	34	6		(120)	51	6½
	51	42	6		(120)	173	6
	52	43	6		(123)	175	6½
	53	54	7		(131)	56	7
	55	61	6		(144)	183	7
	57	73	6		(170)	2835	7
	58	74	6		(189)	79	6
	59	75	6		(209)	203	7
	60	77	6		(223)	212	7
	62	80	6		(227)	2859	6½
δ	63	81	4		(231)	93	7
(y)	64	82	6		(243)	98	6½
i	65	84	6		(249)	2866	7
	66	87	6		(252)	101	6½
k	67	90	6		(262)	102	7
h^1	68	97	6		(270)	2876	6½
ε	71	103	4		(275)	2747	7
(z)	72	107	6		(286)	6	7
	73	106	6		(311)	122	6
ψ^1	74	108	5		[3041]	2749	7
(H)	75	111	6				

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* 107 Piscium is also 2 Arietis.

PISCI'COLA, one of the names for the *Hirudo Piscium* (*Hæmocharis*, Sav., *Icthyobdella*, Blainv.), which infests fish, especially the *Cyprinidæ*. [LEECHES, vol. xiii., p. 382.]

PISI'DIA (Πισιδία) formed the northern part of the Syrian and Roman provinces of Pamphylia. [PAMPHYLIA.] The name of Pamphylia was confined to a narrow slip of land along the sea-coast; while the mountainous country inland was called Pisidia. In these mountains, which formed a part of Mount Taurus, the Pisidians maintained their independence under the Persian empire. (Xen., *Anab.*, i. 9, § 14; ii. 5, § 13; iii. 2, § 23.) Neither the Syrian kings nor the Romans were able to subdue them, though the latter obtained possession of some of their towns, as for instance, of Antiocheia, where a Roman colony possessing the Jus Italicum was founded. (*Dig.*, 50, tit. 15, s. 8, § 10; Plin., *Hist. Nat.*, v. 24.) In the time of Strabo the Pisidians were governed by petty chiefs, and principally supported themselves by plundering their neighbours. (Strabo, xii., p. 570.)

We know very little of the physical geography of Pisidia, or of the situation of its towns. Mr. Fellows, who visited the western part of the country in 1838, informs us (*Excursion in Asia Minor*, p. 165) that the rocks are generally of marble, and some of common limestone with veins of marble running through them in all directions. Mr. Fellows states that 'the most singular features in this district are the mountains of volcanic dust, which he saw at 10 miles distant, looking as if they were smoking; this appearance being caused by the sand, which with every little wind is blown into clouds, and carried into the air and along the valleys. Out of these hills rise jagged points of marble rocks, each of which forms a nucleus of the drifting sand. The whole of this light sand or dust is tufa, the dust of the pumice-stone, and a volcanic production; the decomposed lime has in many parts mixed with this tufa and formed hills of Roman cement.'

The chief towns of Pisidia were Antiocheia, Sagalassus, and Selge.

Antiocheia, which, as already mentioned, was a Roman colony, was situated in the north-western part of the country. It was founded by a colony from the Magnesians on the Mæander. (Strabo, xii., p. 577.) It was visited by St. Paul and Barnabas, and it appears from the narrative in the *Acts of the Apostles* (xiii., 14-51) to have been a place of considerable importance. Its site is uncertain.

South-west of Antiocheia was Sagalassus, which is spoken of by Arrian (i. 28) as a considerable city. Strabo (p. 569. Casaub.) says it is also called Selgessus, and is a day's journey from Apameia: he adds that from the acropolis to the town is a descent of near 30 stadia. The ruins of Sagalassus, according to Mr. Fellows (p. 167), are very extensive, consisting of seven or eight temples, and three other long buildings, ornamented with cornices and columns, and with rows of pedestals on each side. Mr. Fellows also saw there a most beautiful and perfect theatre on the side of a higher hill than the rest of the ruins, and remarks that 'the whole town is a pile of superb public buildings, arranged in excellent taste both for seeing and being seen. The town has no trace of walls, but its tombs are to be seen carved in the rocks for miles around, with much architectural ornament.' These ruins are called by the Turks Boodroom, and were visited by Lucas (i., 180).

South-east of Sagalassus was Selge, the most important town in Pisidia. Selge is said to have been first founded by Calchas and afterwards by the Lacedæmonians, and in consequence of its good government soon became a large and flourishing town. Strabo says (xii., p. 570) that at one time it contained a population of 20,000 inhabitants. When Alexander marched through Pisidia, the inhabitants of Selge sent ambassadors to him, and obtained favourable terms from him. (Arrian, i. 28.) The territory of Selge, though mountainous, was, according to Strabo, very fertile. It produced abundance of oil and wine, and afforded pasturage for great numbers of cattle. The forests supplied a great number of timber-trees, of which the styrax was reckoned the most valuable. Mr. Fellows visited the ruins of a large city, situated about 10 miles north-east of the village of Boojak, which are in all probability those of Selge. Mr. Fellows describes these ruins as situated at the end of a ridge of mountains of white marble, which terminated abruptly in a deep and rich valley, and having only one side accessible, the other three rising perpendicularly perhaps 1000 feet. Mr. Fellows says (p. 172), 'that he rode for at least three miles through a part of the city, which was one pile of temples, theatres, and buildings, vying with each other in splendour.' He also states that he could scarcely guess the number of temples or columned buildings in the town, but that he certainly traced fifty or sixty; and in places where there were no remains above the surface he frequently saw vast arched vaults, similar to those forming the foundation of great public buildings.

PISI'DIA. [PORCELLANIANS.]

PISI'DIUM. [PISUM. (Zoology.)]

PISCIS AUSTRA'LIS or **AUSTRI'NUS**, or **NO'TIUS** (the Southern Fish), one of the old constellations situated directly under Aquarius: the stream from the water-pot of the latter constellation finishes at the mouth of this fish. It contains a remarkable star of the first magnitude, Fomalhaut, which only just rises above the horizon in these latitudes; when on the meridian, it is nearly in the same vertical circle with α and β Pegasi.

The principal stars are as follows:—

Character. ( ) not in Bayer.	No. in Catalogue of		Magnitude.
	Flamsteed. (Piazzi.)	Astron. Society.	
	3	2511	6
	4	2518	4½
	8	2558	4½
ι	9	2577	4
θ	10	2587	4
η	12	2608	5
λ	16	2644	4½
β	17	2689	3
ε	18	2705	3½
(ψ¹)	20	2718	6
γ	22	2728	5
α	24	2741	1
(φ)	(19)	2642	5½
	(37)	2652	6
	(91)	2675	6

PISCIS VOLANS (the Flying-Fish), one of Bayer's southern constellations, situated between the South Pole and Argo. Its principal stars are as follows:—

Character. ( ) not in Bayer.	No. in Catalogue of		Magnitude.
	Lacaille.	Astron. Society.	
γ	635	901	5
δ	646	914	5
ε	749	1009	5
β	768	1040	5
η	769	1039	5
α	829	1110	5

PISISTRA'TIDÆ. Hippias and Hipparchus were the two sons of Pisistratus, after whose death Hippias, the elder, succeeded to the rule. Thucydides tells us that the general opinion in his time was, that Hipparchus succeeded his father; this however he asserts to be a mistake, although in the same chapter (Thucyd., vi. 54) he observes incidentally that Hipparchus was not unpopular in his government, thereby implying that he had some share therein.*

Thucydides gives the brothers a character for encouraging manly virtue and cultivation (ἀρετὴν καὶ ξύνεσιν), for success in war, for piety, and for lenity in taxation. He says they only levied a rate of five per cent. on produce (τὰ γιγνόμενα), and that they rather interfered in the appointments to offices than with the administration of the laws themselves. He gives Pisistratus, son of Hippias, as one among others of the family (αὐτῶν) who served the office of archon.

Hipparchus, the younger son, lost his life by a conspiracy during the rule of his brother. He made offers of a degrading nature to Harmodius, a young Athenian, and meeting with a repulse, insulted his sister by refusing her admittance to a procession on the score of unworthiness. Harmodius resented the double indignity, and formed a plan with his friend Aristogeiton and some few others to relieve themselves from so hateful a tyranny. Hippias was their first object, but finding themselves detected, they attacked Hipparchus with the violence of insulted men, and slew him at the cost of their own lives. The other conspirators were detected. Hippias exchanged popular manners for suspicious cruelty, and at the same time took measures for ingratiating himself with Darius, king of Persia. In the fourth year of his rule he was expelled, with Spartan aid, by the fugitive Alcmæonids, and retired to Sigeum on the Hellespont, thence to Lampsacus, and lastly to the court of Persia, to return again in old age as the companion of the enemies of Greece, and to witness their overthrow at Marathon nineteen years afterwards. [MARATHON.] Herodotus relates that the Spartans repented of having expelled him, but that their plans to restore him were opposed by the Corinthians, and fell to the ground.

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* In the famous song to Harmodius and Aristogeiton, the person killed is called τύραννος.

(Herodotus, v. 91-96; Thucydides, vi. 54-59.)

PISI'STRATUS (Πεισίστρατος), son of Hippocrates, lived at the same time with Crœsus, king of Lydia, and ruled over Athens in that fashion which was called by the name of tyranny.[*] He was the friend and relation of Solon, and, during the lawgiver's absence, had formed and led one of the three parties into which Athens was then split, namely, that of the Highlands: Megacles and Lycurgus heading those of the Coast and of the Plain. In the year 560 B.C., Pisistratus, having matured his plan of self-aggrandisement, drove into the market-place, himself and his mules marked with wounds inflicted by his own hand. He attributed these wounds to the enemies of the people, whose friend he was, and asked a guard, to which his brilliant services gave him some claim. Fifty mace-bearers were granted him, with whose help he made himself master of the Acropolis. His triumph however was in the first instance but short-lived.[†] Not long after, as Herodotus tells us, the other two factions joined to drive him out, his rule not being as yet deeply rooted. A new quarrel between Megacles and Lycurgus proved the means of his recal, and he strengthened himself by taking a daughter of Megacles for his second wife. As one of the Alcmæonids, she was held to be stricken with a curse, and Pisistratus, as his mother-in-law discovered, slighted her in consequence, so as to leave her a wife only in name. Pisistratus was again expelled, and continued in exile for about thirteen years; indeed he seems to have hesitated whether he should ever attempt to return. The judgment of his son Hippias however prevailed, and after many years' preparation, he landed at Marathon, took his foes by surprise, routed them, spared the fugitives, and was master of Athens. He strengthened himself by foreign and native mercenaries, by gaining the favour of the poor, and taking hostages of the rich, and ruled till his death, which took place B.C. 527.

Herodotus observes that Athens, great as she was under the tyrants, waxed yet greater afterwards: a way of expressing that the rule of Pisistratus was a breathing-time, after the reforms of Solon, which gave opportunity for those reforms to sink into the heart of the people, to become not merely enacted but active, and which rendered the next age more brilliant in production than it otherwise would have been. To Pisistratus also were owing the first steps in art taken at Athens, the first important public buildings, the first poor's-rate, under the guise of a tax on the rich to defray the expense of those public buildings, and lastly the first library, and the collection (as it is said) of the poems of Homer.

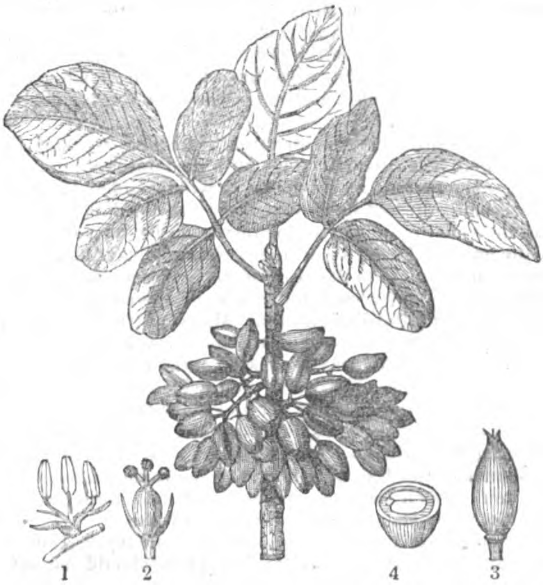
To Pisistratus too are owing, in one sense, the glories of the Persian war. Had he retired, as Hippias afterwards did, to the court of Persia, that war might have been antedated some sixty years, the power of Greece would have been two generations less mature, Persia so much less corrupt, and thus the issue of the contest might have been reversed.

(Herodotus, i. 59, 64; v. 65; vi. 35, 103.)

PISO, C. CALPU'RNIUS. [CÆSAR; CICERO.]

PISOLITE, or *Pea-Stone*, a variety of carbonate of lime, which occurs in globules from one-eighth to half an inch in diameter, imbedded in a calcareous cement; they usually consist of concentric lamellæ, in the midst of which is generally a grain of sand.

PISTA'CHIA NUT, the fruit of the *Pistacia vera* of botanists, is the produce of a small tree, or large bush, from 15 to 20 feet high; its leaves are alternate, unequally pinnated, without stipules, and consist of from 3 to 5 oval blunt leathery smooth leaflets. The flowers are small and arranged in short branched racemes from the old wood; some are male and others female; the latter are succeeded by dry drupes about the size of an olive, of a reddish colour, with a very thin rind, a brittle two-valved shell, and contain a single almond-like seed with a green embryo. The tree is originally from Asia Minor, but is now naturalised all over the South of Europe, where the fruit is in request for confectionary and for the dessert.



Pistacia vera.

1, a male flower; 2, a female; 3, a ripe fruit; 4, a seed cut transversely.

PISTO'IA, a town of Tuscany, in the compartimento or province of Florence, is situated twenty miles north-west of the capital, in a plain at the foot of the Apennines, near the river Stella, a tributary of the Ombrone, which is an affluent of the Arno. Pistoia lies on the high road leading from Florence to Modena over the Apennines. It is a well-built town, of considerable size, but rather thinly inhabited; it contains about 10,000 inhabitants, and is a bishop's see.

Pistorium, or Pistoria, does not appear to have been a place of importance under the Romans, except that it was near one of the passes leading into Cisalpine Gaul, and was probably a military station. In the 'Antonine Itinerary' the station is marked 'ad Pistores.' Sallust (*Catilin.*, 57) mentions that Catilina assembled his followers in the territory of Pistoria, with the intention of leading them across the mountains into Gaul, but he was forestalled by Q. Metellus Celer, who encamped on the other side of the mountains.

Pistoia was a place of importance under the Longobards, whose king Desiderius enclosed it with walls. It was afterwards an independent municipality, until it was subjugated by Florence, about A.D. 1150. It appears however that the Florentines allowed it to retain its municipal franchises, but reserved to themselves the appointment of the podesta or chief magistrate. There was an influential family of Pistoia of the name of Cancellieri. This family in course of time became divided into several branches, and a dispute arising among them which was attended with bloodshed, the various members of the family were ranged into two opposite factions, one of which called itself 'I Bianchi,' or 'the white,' because descended from the wife of one of the former Cancellieri whose name was Bianca. The opposite faction took the name of 'Neri,' or 'the black.' These factions having each numerous adherents and dependents, the whole town of Pistoia became divided between the Bianchi and the Neri. The people of Pistoia are represented by the contemporary chroniclers as a strong and daring, but fierce and quarrelsome race. Some of the Cancellieri of the Bianchi faction being connected with a Florentine party-leader, named Veri De Cerchi, an influential man among the Florentine Guelphs, the latter contrived to appoint as chief magistrate of Pistoia a friend of his own, called Cantino. This person favoured the Bianchi, and in the next election of the elders or municipal councillors he had them all chosen from among the Bianchi, saying that such was the will of the council of Florence, which however was not true. This measure excited many disturbances, which the elders of Pistoia, supported by the Florentines, availed themselves of in order to oppress their rivals of the Neri faction, on whom they imposed fines and other penalties. This state of things continued for several years, during which the Florentine podestas who were successively sent to Pistoia contrived to fill their pockets from fines and condemnations. (Dino Compagni, *Cronaca.*) These things happened in the latter part of the thirteenth century. But the quarrel between the Neri and the Bianchi spread to Florence, where the two families of Cerchi and Donati disputed for the pre-eminence in the councils of the republic. The Donati assumed the name of Neri, and, with the assistance of Charles of Valois, they succeeded in driving away their antagonists in 1301. [Dante.]

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[*] The classical reader need not be reminded that the Greek word from which our word *tyrant* is taken, only means one who rules contrary either to the letter or spirit, or both, of the laws, not necessarily one who acts either with cruelty or even injustice. Thus Herodotus (i. 59) expressly tells us that Pisistratus 'ruled without either disturbing authorities or changing institutions, and that he governed the state on the principles then established, and ordered it fairly and well;' yet Pisistratus was a tyrant.

[†] Mr. Clinton says the time is uncertain; Mr. Thirlwall gives it at five years.

The Florentine Neri afterwards proceeded to attack Pistoia, where the Bianchi were still predominant; but not being able to take it by force, they blockaded the town, which being pressed by famine, the council ordered the poor and most of the women and children to be turned outside of the gates. These unfortunate creatures, says Dino Compagni, on coming into the camp of the besiegers, were shamefully used by their own townsmen of the adverse faction, who were with the Florentines. Many of them, after enduring all sorts of abuse, had their noses, or hands, or feet cut off, and in this mutilated state were carried back to the foot of the town-walls, in order to frighten the besieged, but the magistrates did not allow them to be taken in, and thus they died miserably outside. (Dino Compagni, *Cronaca Fiorentina.*) Those who are so ready to extol the prosperity of the Italian republics of the middle ages, ought to dwell on such scenes as these, in order to form a correct opinion of the state of society in those times.

At last Pistoia surrendered, on the 10th April, 1306, on the condition that persons and property should be safe; but no sooner had the Florentines entered the town, than they razed the walls to the ground. Pistoia never recovered from that blow. It continued, with some short interruptions, to be subject to Florence, and followed its destiny through the various changes of government.

There are many remarkable buildings in Pistoia. The cathedral, which was built by the Countess Matilda, in the early part of the twelfth century, and restored by Nicolo di Pisa, contains some good paintings, basso-relievos, and the monument of Cino da Pistoia, the friend of Dante and Boccaccio, a jurist and an elegant poet; and also that of Cardinal Nicola Forteguerri, a distinguished character of the fifteenth century. The other churches worthy of notice are, S. Pietro Maggiore, L'Annunziata, S. Filippo Neri, Santa Maria dell' Umilta, S. Gio. Battista, S. Domenico, and S. Giovanni Rotondo. The palace del Comune, or degli Anziani, dates from the thirteenth century, and contains several monuments of the middle ages. The episcopal palace, raised in the last century by the Bishop Ricci, is a sumptuous building. The clerical seminary was also built by Ricci. La Sapienza, or the public schools, has a good library. There is also at Pistoia an academy of sciences and belles-lettres. The private palaces of the families Bracciolini, Cancellieri, Rospigliosi, Tolomei, and Forteguerri contain good paintings. (Valéry, *Voyages Littéraires en Italie.*)

Pistoia has produced distinguished men in almost every branch of learning and art: Cino da Pistoia, the poets Forteguerri and Bracciolini, Pope Clement IX., the poetess Corilla; the architects Ventura and Vitoni; the painters Gerini, Malatesta, and Cipriani (who died in London, in 1790); the sculptors Ennio da Pistoia, Ognabene, and Cornacchini; and many more, who are noticed by Tolomei, in his 'Guida di Pistoia,' 8vo., 1821; by Zaccaria, 'Bibliotheca Pistoriensis descripta,' Turin, 1754; and by Ciampi, 'Notizie Inedite della Sagrestia Pistoiese dei belli Arredi,' Pisa, 1812. Ciampi has also published an interesting biography of Cino, 'Vita e Poesie di Messer Cino da Pistoia,' 8vo. Pisa, 1813.

The history of Pistoia has been written by Fioravanti, 'Memorie Storiche,' Lucca, 1758, and also in the 'Istorie Pistolesi,' an anonymous work, printed at Florence, by Giunti, 1578. Viani has written 'Della Zecca e della Monete di Pistoia,' Pisa, 1813.

PISTOL. [Arms.]

PISTOLE. [Money.]

PISTON. [Hydraulics.]

PISUM. [Pea.]

PISUM (Zoology), Megerle's name for a genus of conchifers (*Pisidium*, Leach), separated from Cyclas. *Quæretamen.*

PITCAIRN'S ISLAND is a small island in the Pacific, the centre of which is in 25° 3′ 37″ S. lat. and 130° 8′ 23″ W. long. It is about seven miles in circumference, and very high, with precipitous sides, and without anchorage. Some of the rocks are volcanic. The highest point of the island is 1109 feet above the sea-level. The ascent from the beach is generally extremely steep, and two of the three landing-places are not used. The third landing-place is on the north side of the island, but the approach is very dangerous. The soil which covers the rock consists of clay mixed with sand; it is very rich and of great depth. It is supposed that the island could maintain a population of 1000. There is only one well of good and one of indifferent water. Most of the mountains are still covered with trees. This island, which was discovered by Cook in 1777, now contains a colony of Englishmen and Otaheitean women, whose offspring form the whole population of the island. After the mutiny of the Bounty [Bligh], Fletcher Christian sailed first to Toobouai, one of the Pamuto Islands, and then to Otaheite, where he took in animals and plants, and then returned to Toobouai, with the intention of settling there, having left the larger part of his crew in Otaheite and taken with him six males and twelve women. But not finding the natives of Toobouai inclined to permit them to settle on their island, he established his colony on Pitcairn's Island in 1790. This island was first visited by an American vessel in 1809, and afterwards by the Briton, in 1814. In 1826 the island was surveyed by Captain Beechey. As a report prevailed that the inhabitants suffered much from want of water, a vessel was sent to remove those who were willing to go to Otaheite, which was effected in 1831, when the population had increased to 87 in number. But the new settlers found that they had not improved their condition by this change, and they returned to Pitcairn's Island in 1832. They are a fine and robust people, high-spirited, and intelligent, and speak both the Taheitian and English languages fluently. Their food is chiefly vegetable. Yams, which are abundant and of excellent quality, are the principal article of food. Cocoa-nuts, bananas, and pumpkins also grow, but the bread-fruit tree yields a scanty crop of indifferent fruit. Swine, goats, and domestic fowls are reared, and fish is rather abundant. Before their removal to Otaheite, the islanders were distinguished by their patriarchal simplicity, modified by the English character; but since that time they have taken to drinking spirits, the preparation of which they had learnt in Otaheite.

(Shillibeer's *Narrative of the Briton's Voyage:* Beechey's *Narrative of a Voyage to the Pacific, &c.; Recent Accounts of the Pitcairn Islanders*, by Barrow, in *London Geogr. Journal*, vol. iii.; Bennet's *Extracts from the Journal of a Voyage round the Globe*, in *London Geogr. Journal*, vol. vii.)

PITCAIRNE, ARCHIBALD, M.D., was born at Edinburgh in 1652. He studied divinity and afterwards law at that university with extreme ardour; but being obliged by the failure of his health to go to Montpellier, he there acquired a love of medicine. On his return to Edinburgh, he devoted himself to the pursuit of its several branches and to the study of mathematics, by the application of which he believed (as many of his contemporaries did), that much light might be thrown upon the phenomena of life. He afterwards studied in Paris, and thence returning to his native place, he soon became the most renowned practitioner in it. In 1692 he was invited to the professorship of medicine at Leyden; but his mathematical theories being less agreeable than the doctrines of vitalism, which were then becoming prevalent, he held the appointment little more than a year, and then returned home, having reaped no other honour than that of having had the celebrated Boerhaave among his pupils. He died at Edinburgh, in 1713.

Dr. Pitcairne's chief work was published after his death, under the title of 'Elementa Medicinæ Physico-Mathematica;' but, like most others of the same class, it contains little that is now considered valuable. He also wrote a work to prove Harvey's claim to the discovery of the circulation of the blood, and several dissertations on the utility of mathematics in the study of medicine.

PITCH. [Tar.]

PITCH, in Music, a tone or degree in musical sounds, whether grave, or acute, or intermediate. It may be the key-note, or the note on which any air or part begins. The pitch of c, the third space in the treble, is a sound produced by 512 vibrations in one second. [Concert-Pitch.]

PITCHSTONE occurs massive. Structure compact, sometimes slaty, occasionally curved. Fracture imperfectly conchoidal. Hardness 5·0 to 6·0. Colour brown, black, grey, red, &c., and variously mixed. It is generally dull, but has sometimes a resino-vitreous lustre. Translucent. Opaque. Specific gravity 2·3 to 2·7.

It occurs at Meissen in Saxony, at Newry in Ireland, and in the Island of Arran, and other places.

Analysis of Irish pitchstone by Knox:—Silica, 72·80; alumina, 11·50; soda, 2·85; lime, 1·20; protoxide of iron, 3·03; water, 8·50.

PITCHSTONE (Geology), a siliceous rock of igneous origin, generally occurring in dykes which traverse the strata, or in overlying columnar masses. Among recent volcanic rocks its analogue is obsidian. M'Culloch gives the characters of pitchstone in the following leading divisions:—

1, Simple: *a*, amorphous, massive; *b*, concretionary.
2, Porphyritic: pitchstone-porphyry of mineralogists.
3, Concretionary spheroidal; pearlstone of mineralogists.
4, Amygdaloidal: containing imbedded zeolites, &c.

The colours are extremely various; the texture varies from almost glassy to granular, and thus allows of passage into hornstone.

PITEA. [Bothnia.]

PITH is a cellular substance found in the centre of the branches, but not roots, of Exogens. When young it is filled with fluid and with grains of starch, which gradually disappear as the foliage in communication with the pith becomes organised; and there can be no doubt that this part is in reality a magazine of nutriment upon which the leaves may feed in their infant state. After the leaves in communication with it are organised, it dries up and dies. The old statements that it is the seat of fertility, a tree becoming unfruitful whose pith is destroyed, like the more modern assertion that it is the seat of nervous irritability, are mere fables. It communicates with the bark by means of the medullary rays, and with the leaves by means of cords of fibro-vascular tissue emanating from the medullary sheath. In Endogens there is no pith, but the office of that part is probably performed by the cellular substance in which the fibro-vascular cords of woody matter are imbedded.

PITHE'CIA. [Sakis.]

PITHE'CUS, M. Geoffroy's name for the Orangs. [Ape; Chimpanzee; Orang-Utan.]

PITHIVIERS. [Loiret.]

PITHYS. [Merulidæ, vol. xv., p. 122.]

PITISCUS, SAMUEL, was born at Zutphen, March 30, 1637, and in his younger days was the scholar of John Frederick Gronovius. He was appointed master of the public school at Zutphen in 1685, and about the same time was entrusted with the direction of the college of St. Jerome at Utrecht. This last employment he retained till 1717, when, being in his eightieth year, he resigned it. His most important works were his 'Lexicon Latino Belgicum,' the best edition of which is that published at Dort in 1725, and his 'Lexicon Antiquitatum Romanorum,' 2 tom. fol., Leov., 1713. His editions of Quintus Curtius, Solinus, Suetonius, and Aurelius Victor are well known to classical scholars. He likewise edited Pomey's 'Pantheon Mythicum' and Rosin's 'Antiquitatum Romanorum Corpus,' 4to., Utrecht, 1701. He prepared large collections for a 'Lexicon Catullo-Tibullo-Propertianum.' He died February 1, 1727. He acquired considerable property by his works, and is said to have left at his death ten thousand florins to the poor.

(Casp. Burmanni *Trajectum Eruditum*, 4to., Traj. ad Rh., 1738, pp. 268-272; Chalmers's *Biog. Dictionary*, vol. xxiv., pp. 530, 531.)

PITONNELLUS, De Montfort's name for a genus of turbinated testaceous gastropods, *Rotella* of authors. [Turbinidæ.]

PITS, or PITSEUS, JOHN an English biographer, born at Alton in Hampshire, A.D. 1560. He received his early education at Winchester school, whence, at the age of eighteen, he was elected a probationer fellow of New College Oxford, but in less than two years he left the kingdom as a voluntary Romish exile, and went to Douay. He went thence to Rheims, and a year afterwards to the English college at Rome, where he studied seven years, and then returned to hold the professorship of rhetoric and Greek at Rheims. Toward the end of 1590, he was appointed governor to a young nobleman, with whom he travelled into Lorraine, and afterwards went through Upper Germany and Italy. He subsequently returned to Lorraine, where he was preferred to a canonry of Verdun. When he had passed two years at his new residence, Antonia, daughter to the duke of Lorraine, who had married the duke of Cleves, invited him to Cleves to be her confessor. He continued in her service twelve years, till her death, when he returned a third time to Lorraine, and was promoted to the deanery of Liverdun, where he died in 1616. The leisure he enjoyed while confessor to the duchess of Cleves enabled him to compile a work which alone has made him known to posterity, 'The Lives of the Kings, Bishops, Apostolical Men, and Writers of England.' They were comprised in four large volumes; the first containing the lives of the kings, the second of the bishops, the third of the apostolical men, and the fourth of the writers. The three first are preserved in the archives of the collegiate church of Verdun; the fourth only was published after his decease, in 4to., at Paris, 1619 and 1623, under the title of 'Joannis Pitsei Angli, S. Theologiæ Doctoris, Liverduni in Lotharingia Decani, Relationum Historicarum de Rebus Anglicis Tomus Primus,' &c.; but the running title by which it is most frequently quoted is 'De Illustribus Angliæ Scriptoribus.' In this work Pits took much from Bale's book 'De Scriptoribus Majoris Britanniæ' without acknowledgment, pretending at the same time to abhor both Bale and his work. He also quotes Leland's 'Collectanea de Scriptoribus Angliæ,' which Wood asserts he never could have had the means of perusing, but must likewise have taken at second hand from Bale. His partiality is also great. He leaves Wickliffe and his followers, together with the Scotch and Irish writers, entirely out of his work, and in their room gives an account of the Roman Catholic writers, such especially as had left the kingdom after the Reformation in Queen Elizabeth's time, and settled at Rome, Douay, Louvain, &c. This however is the best and most valuable part of Pits's work. He published three small treatises, which are less known: 'De Legibus,' Triers, 1592; 'De Beatitudine,' Ingolst., 1595; 'De Peregrinatione,' 12mo., Düsseldorf, 1604. The last is dedicated to the Duchess of Cleves. (Wood, *Athen. Oxon.*, ed. Bliss, vol. ii., col. 172, 177; *Biograph. Brit.*; Chalmers's *Biogr. Dict.*, vol. xxiv., p. 532-534.)

PITT, WILLIAM, EARL OF CHATHAM, was the second son of Robert Pitt, Esq., of Boconnoc, near Lostwithiel, in Cornwall, by Harriet Villiers, sister of the Earl of Grandison (an Irish peer), and the grandson of Thomas Pitt, governor of Madras, the possessor of the celebrated Pitt diamond, which, according to an account published by himself, he bought in India for 24,000*l.*, and sold to the French king for 135,000*l.* William Pitt was born at Boconnoc, on the 15th of November, 1708. He was educated at Eton, whence he went in 1726 as a gentleman commoner to Trinity College, Oxford. On leaving the university, he obtained a cornetcy in the Blues, and entered parliament in January, 1735, as one of the representatives for the borough of Old Sarum, which was the property of his family.

He immediately joined the Opposition, of which the head at this time was Frederic, Prince of Wales, but for the first session he took no part in the proceedings of the House beyond giving his vote. His maiden speech was delivered on the 29th of April, 1736, on occasion of a motion made by Mr. Pulteney, for an address of congratulation to his majesty on the recent marriage of the prince. The motion was seconded by Mr. Pitt, and was supported by his friend George Lyttelton (afterwards the first Lord Lyttelton), who held the office of secretary to his royal highness. Pitt's speech is described by Tindal as 'unmixed with any strains but that of declamation;' 'and,' he adds, 'we have few models of antiquity more perfect in that kind, it being more ornamented than the declamations of Demosthenes, and less diffused than those of Cicero.' Pitt's appearance and elocution must have been imposing from the first; for there was certainly nothing in the matter of this speech, if we may judge from what appears to be a verbatim report of it, to put any one in mind of either Demosthenes or Cicero. The animosity between the prince and his father now rose to a great height, and, among the other adherents of the former, Pitt experienced the vengeance of the court by being deprived of his commission. It appears indeed that his dismissal from the army took place within a few days after the delivery of his speech. (See the date published for the first time from the Records of the War-Office in an article in the 'Quarterly Review,' No. 131, for June, 1840.) For this loss however he was recompensed by being appointed by the prince one of the grooms of his bed-chamber. The next occasion on which he is recorded to have taken any part in the debates of the House was on an opposition motion for a reduction of the army, on the 3rd of February, 1738; nor did he become a frequent speaker till some years later. He made another speech, of more energy and vehemence than he had yet displayed, in the debate on the 8th of March, 1739, on the convention with Spain; but his name does not again occur in the reports of the debates, either in that or in the following session. He appears to have first taken a prominent part as a debater in the discussion of the successive motions directed against Walpole, in January and February, 1741, towards the close of the seventh and last session of this the first parliament in which he had a seat. It was in one of these debates, professedly on the second reading of the ministerial bill for the encouragement and increase of seamen, which took place on the 27th of January, that he is made, in the report drawn up by Johnson for the 'Gentleman's Magazine,' to have delivered his celebrated philippic in reply to the elder Horatio Walpole (the minister's brother, and afterwards Lord Walpole of Woolterton), beginning 'The atrocious crime of being a young man, which the honourable gentleman has with such spirit and decency charged upon me, I shall neither attempt to palliate nor deny, but content myself with wishing that I may be one of those whose follies may cease with their youth, and not of that number who are ignorant in spite of experience.' It is believed however that this brilliant declamation is almost entirely Johnson's own; the style at any rate is certainly his, and not Pitt's.

To the next parliament, which met in December, 1741, Pitt was again returned for Old Sarum. Walpole resigned in the beginning of February, 1742; but his retirement did not leave the road to office open to Pitt, against whom the king had conceived a violent prejudice, not only on account of the prominent and effective part he had taken in the general assault upon the late administration, but more especially in consequence of certain strong opinions he had expressed on the subject of Hanover, and the public mischiefs arising from his majesty's partiality to the interests of that electorate. It is understood also that Pulteney, the framer of the new ministry, owing to a dislike which existed between his friend Lord Carteret (afterwards earl of Granville), who now became one of the secretaries of state, and Lord Cobham, the friend and relation of Pitt, Lyttelton, and George Grenville, found it impossible or unadvisable to bring any one of the three last-mentioned persons into office for the present, although the most distinguished members of his party. Grenville's elder brother Richard (afterwards Earl Temple) and Lyttelton's father had married sisters of Lord Cobham, and Pitt's elder brother was married to a sister of Lyttelton's.

The nominal head of the new ministry was Lord Wilmington, who held the office of first lord of the treasury; but when Walpole, in a few months after his own fall, had contrived to extinguish Pulteney by forcing him into the House of Lords, where, from being the most popular and powerful man in England, he suddenly dropped down into a despised nonentity as earl of Bath, the real supremacy in the cabinet was divided, or rather contended for, between Carteret and the two Pelhams, the elder of whom, the duke of Newcastle, was the other secretary of state, his brother Henry Pelham being paymaster-general. Wilmington died in July, 1743, and although by Walpole's advice Mr. Pelham was then appointed first lord of the treasury and chancellor of the exchequer, Carteret notwithstanding derived from the favour of the king a power really superior to that of his rival, and upon which his bold and impetuous character made him presume in a manner equally offensive to the public and to his colleagues. In this state of affairs, Pitt soon threw himself again into opposition, and became more active and acrimonious in his denunciations of the new ministry than he had ever been in inveighing against Walpole himself. On the subject of the king's Hanoverian partialities in particular, to his sympathy with which Carteret was understood chiefly to owe his influence over the royal mind, the eloquent commoner was now louder and more eloquent than ever. He and Lyttelton are also said to have both been members of the secret committee of six, headed by Bubb Dodington (afterwards Lord Melcombe), by which all the operations of the opposition were now directed.

Carteret, now become lord Granville, was dismissed a few days before the opening of the session of parliament in November, 1744; and what was called the *broad-bottom ministry* was formed, with Mr. Pelham, in reality as well as in appearance, at its head. But although his friends George Grenville and Lyttelton both obtained places in the new arrangement, Pitt's time was not yet come; his recent conduct in fact had given additional provocation to the king. From this date however he ranged himself among the supporters of administration, and not merely softened his tone touching Hanover and other delicate points, but even did not scruple to unsay and retract a good deal of what had in past years formed the staple of his oratory.

In the beginning of the year 1746 an attempt was made by the duke of Newcastle to overcome the king's repugnance to the admission of Pitt into office; but the insinuations of Pulteney are said to have been employed to strengthen the royal aversion; and his majesty made a desperate struggle to escape the threatened infliction. On the 10th of February lord Bath was actually named first lord of the treasury and the head of a new administration, with his friend Granville for secretary of state; but it was found that this project could not be carried through; and four days afterwards Pelham and all his colleagues were again in the occupation of their several offices. On the 22nd Pitt was appointed one of the joint vice-treasurers for Ireland; and on the 6th of May following he was promoted to the more lucrative office of paymaster-general. After each of these appointments he was re-elected for Old Sarum. To the next parliament however, which met in November, 1747, he was returned, by the influence of the government, for Seaford, one of the Cinque Ports. On this occasion the duke of Newcastle is said to have personally interfered in the election in the most open manner; but when the return was petitioned against on this account, Mr. Pitt, according to the report of the debate, 'treated the petition with great contempt, and turned it into a mere jest;' and the motion for its being taken into consideration was negatived by a great majority. The opposition in fact was now reduced to a helplessly inconsiderable fraction of the house.

A few years before, Pitt's pecuniary circumstances had been rendered much easier by a legacy of 10,000*l.*, left to him by the duchess of Marlborough, 'in reward,' as her will expressed it, 'for the noble disinterestedness with which he had maintained the authority of the laws, and prevented the ruin of his country.' He had thereupon resigned his post in the household of the Prince of Wales, and indeed had separated himself entirely from his royal highness, who still remained the recognised head of the opposition, such as it was, till his death in March, 1751. Mr. Pitt distinguished himself in his new place by a proud disdain of certain sources of emolument of which his predecessors had been accustomed to avail themselves; and also by the frank and courageous style in which he went on urging and defending the course of national policy, especially in relation to foreign affairs, which the whole of his previous parliamentary life had been spent in opposing and reprobating. His change of opinion or feeling may be illustrated by a speech he made in the debate on the address of thanks at the opening of the session in January, 1751, in reference to the abandonment by the government, at the recent peace of Aix-la-Chapelle, of the claim of exemption from search for British ships when found near the coast of Spanish America—a claim which, when in opposition, he had passionately insisted ought to be made an indispensable preliminary to any treaty of peace with Spain. 'I was then,' he said, 'very young and sanguine; I am now ten years older, and have had time to consider things more coolly.' And he added, referring to a motion which he had formerly supported for an address to the crown against concurring in any peace in which this claim should not be recognised, 'I am also convinced that all addresses from this house, during the course of a war, for prescribing terms of peace, are in themselves ridiculous;....and as the crown has the sole power of making peace or war, every such address must certainly be an encroachment upon the king's prerogative, which has always hitherto proved to be unlucky.' However wise this language may have been, or however sincere and honest, there is no bitterness of deprecation and scorn which it would not have drawn down from Pitt upon the head of any luckless member of the government by whom it might have been uttered but a very few years before.

The discussions upon the Regency Bill, which in this session followed the death of the Prince of Wales, first brought out that opposition between Pitt and Henry Fox (afterwards the first Lord Holland), which not only made them rivals during their lives, but gave rise to a competition for the chief power in the state in which their two celebrated sons also spent their days. For the present the influence of the Pelham section of the cabinet, which Pitt represented, prevailed over that of the Bedford section, which supported Fox: Fox himself, who was secretary at war, kept his place, as well as Pitt; but his patron the duke of Bedford resigned, along with one or two friends who also belonged to the cabinet, and whose seats were immediately filled by connections or dependants of the Pelhams. The arrangements now made subsisted till the sudden death of Mr. Pelham, in March, 1754; upon which the duke of Newcastle was appointed first lord of the treasury and premier. A few weeks after, the parliament was dissolved. This year Pitt drew closer his connection with the Grenvilles by his marriage with Hester, sister of the right honourable George Grenville, and of his brother, the then viscount Cobham, afterwards earl Temple.

To the new parliament, which met in November, 1754, Pitt was returned for the duke of Newcastle's borough of Aldborough in Yorkshire. Before the end of the session however a complete breach had taken place between Pitt and his grace; which ended, after about a year, in a reconstruction of the government. On the 15th of November, 1755, Fox was appointed secretary of state, and, five days after, Pitt and his friend Grenville both received intimations that his majesty had no further occasion for their services. But after about another year, Newcastle, already deserted by Fox, found it necessary to resign a position for which the nearly unanimous voice of the public had pronounced him unfit, and his occupation of which had only been signalised by a series of national disasters and disgraces. In this crisis of affairs the king, after a short struggle, found it necessary to call in the popular favourite of the hour; and although the office of first lord of the treasury was given for the present to the duke of Devonshire, Pitt, appointed secretary of state, became the actual premier, with a cabinet consisting of his personal friends and the other chief members of his party, in December, 1756. He was now returned both for the town of Buckingham and for Oakhampton, and chose to sit for the latter. But this first ministry of Pitt's lasted only for a few months. The king's old aversion had not been weakened by the manner in which the man of the people had been forced upon his acceptance; and in April of the year following (1757), his majesty abruptly sent Lord Temple his dismissal from the post he held of first lord of the admiralty, an act which was immediately followed, as must have been foreseen and designed, by Mr. Pitt's resignation. For two months and a half the country remained without a government, during which time the court applied in succession to almost every section of party-men in the country, without being able to prevail upon any individual to undertake the management of affairs. At last, on the 11th of June, Lord Mansfield received full powers from his majesty to open negociations with Mr. Pitt and the duke of Newcastle; the result of which was that before the end of the month Pitt was again premier, with the seals of secretary of state. Newcastle was re-appointed first lord of the treasury; Pitt's friends, earl Temple, George Grenville, and Mr. Legge, became respectively lord privy seal, treasurer of the navy, and chancellor of the exchequer; Mr. Fox was made paymaster of the forces; and even Lord Granville obtained a seat in this comprehensive cabinet as president of the council. Upon this new appointment Mr. Pitt was chosen member for Bath, for which he was also returned to the next parliament, which met in November, 1761, and which was the last place he represented.

The detail of the brilliant military successes which distinguished Mr. Pitt's administration belongs to the general history of the country; but an enumeration of the principal results of his conduct of the war may be found in the article on George II., vol. xi., p. 161. The new reign however brought along with it the ascendancy in the cabinet of Lord Bute and his friends [Bute, Earl of, and George III.]; and on the 5th of October, 1761, a few weeks before the meeting of parliament, Mr. Pitt, on the refusal of his colleagues to acquiesce in his proposition of declaring war against Spain, resigned, along with his friend Earl Temple, the only member of the cabinet who had supported his views. On his retirement however a pension of 3000*l.* a year for the lives of himself, his wife, and his eldest son, was conferred on Pitt, and his wife was made a peeress with the title of Baroness Chatham. These honours and rewards did not increase the popularity of the late premier.

In his new position nevertheless Pitt acted a sufficiently independent part. Without engaging in any factious opposition, but on the contrary giving a general support to the government, he directed his eloquence against certain of their measures with all his old energy and fervour. In particular he denounced the preliminaries of peace signed in November, 1762; resisted as far as he could, though ineffectually, the famous bill for extending the excise regulations to the manufacture and sale of cider, brought forward in the same session; and the next session took a conspicuous part in maintaining against ministers the illegality of general warrants on the proceedings that arose out of the affair of Wilkes and his 'North Briton.' Before this last question arose, the premiership, by the sudden resignation of Lord Bute, in April, 1763, had fallen for a time into the hands of George Grenville, who had continued in office when his brother Lord Temple and Pitt had retired in October, 1761, and had ever since remained separated from his old friends. In September, 1763, an attempt had been made to bring Pitt again into the cabinet; but he declined the overtures made to him when he found he was not to have the first place; and when parliament met in November the head of the ministry was considered to be the Duke of Bedford, who, on the failure of the negotiation with Pitt, had been appointed to the office of president of the council

Another attempt which the king made, in May, 1765, to obtain the assistance of Mr. Pitt in forming a new cabinet, proved equally unsuccessful with the last, and so did a renewal of it in June following. It was while these negotiations were in progress that Burke, not yet himself introduced to public life, but a keen observer of the scene in which he was soon to be one of the most brilliant figures, wrote to Flood: 'Nothing but an intractable temper in your friend Pitt can prevent a most admirable and lasting system from being put together, but this crisis will show whether pride or patriotism be predominant in his character; for you may be assured he has it now in his power to come into the service of his country, upon any plan of politics he may choose to dictate, with great and honourable terms to himself and every friend he has in the world, and with such a strength of power as will be equal to anything but absolute despotism over king and kingdom. A few days will show whether he will take this part, or continue on his back at Hayes talking fustian.'

The result was the accession of the Rockingham administration, in which Pitt had no place, but whose measures generally had his support, although in the debate on the address in January, 1766, he declared that he could not give them his confidence, adding, while he bowed to the treasury bench, 'Pardon me, gentlemen, confidence is a plant of slow growth in an aged bosom; youth is the season of credulity.' It was upon this occasion that he announced his peculiar view of the constitutional question involved in the dispute already begun with America. 'It is my opinion,' he said, 'that this kingdom has no right to levy a tax upon the colonies. At the same time I assert the authority of this kingdom over the colonies to be sovereign and supreme in every circumstance of government and legislation whatsoever. Taxation is no part of the governing or legislative power. The taxes are a voluntary gift and grant of the Commons alone. In legislation the three estates of the realm are alike concerned; but the concurrence of the peers and the crown to a tax is only necessary to close with the form of a law. The gift and grant is of the Commons alone. To this singular and not very intelligible theory Pitt clung to the end of his days, dying, indeed, it may be said, in the utterance and vindication of it.

Meanwhile in the difficulties to which this ministry also soon found itself reduced, another application was made to Pitt, so early as the end of February, 1766. At that time it came to nothing, but the attempt was renewed after a few months; and in the end Pitt received a *carte blanche* to frame a new cabinet, which was completed about the beginning of August. And a very extraordinary piece of handywork it turned out. 'He made an administration,' as Burke has said in a famous passage, 'so chequered and speckled; he put together a piece of joinery so crossly indented and whimsically dovetailed; a cabinet so variously inlaid; such a piece of diversified mosaic; such a tessellated pavement without cement; here a bit of black stone, and there a bit of white; patriots and courtiers, king's friends and republicans, whigs and tories, treacherous friends and open enemies, that it was indeed a very curious show, but utterly unsafe to touch and unsure to stand on.' What most astonished the public in the whole arrangement was the manner in which Pitt disposed of himself: he appropriated the almost sinecure place of lord privy seal, and, leaving the old scene of his glory, went to the Upper House as Viscount Pitt and Earl of Chatham. 'The joke here is,' wrote Lord Chesterfield to a friend on the occasion, 'that he has had *a fall upstairs*, and has done himself so much hurt that he will never be able to stand upon his legs again. Everybody is puzzled how to account for this step; though it would not be the first time that great abilities have been duped by low cunning. But, be it what it will, he is now certainly only earl of Chatham, and no longer Mr. Pitt in any respect whatever.'

We cannot enter into the history of the rickety administration thus attempted to be set up. Suffice it to say that it was in a state of confusion and embarrassment all the time it subsisted, and that Lord Chatham, its nominal head, was soon withdrawn from all share in the conduct of affairs by a serious illness, which, from the evidence furnished by his lately published correspondence, clearly appears to have been chiefly mental, and to have taken the form of a deep hypochondria, making him shrink with horror from business and from intercourse with any person beyond the circle of his own family. At last, on the 15th of October, 1768, he sent his friend Lord Camden to the king with a resignation of his office.

This decision, and the relief from responsibility which it brought with it, probably had a beneficial effect on his health. In the session of parliament which began on the 9th of January, 1770, he again appeared in his place, and took as prominent and active a part in debate as he had ever done in his best days. One of the chief questions on which he exerted himself in this and the next session was that of the conduct of the House of Commons in the affair of Wilkes's election for Middlesex, which he condemned vehemently and without reserve, and contended to be a flagrant outrage on the first principles of the constitution. He also appeared occasionally in the session which began 21st January, 1772; in one speech in particular, which he delivered in May that year, in support of a bill for the relief of Protestant Dissenters, he showed, according to the report of the debate, 'as much oratory and fire as perhaps he ever did in his life.' But his name does not appear again in the debates till towards the end of the session of 1774, on the 27th of May in which year, though still labouring under a state of ill-health, which had long kept him absent from the House, he spoke warmly and impressively in opposition to one of Lord North's bills for subduing the resistance in America. He spoke also several times on the same now all-engrossing subject in the earlier part of the first session of the next parliament, which met in November of this year; but then a return of ill-health sent him back for nearly two years into retirement. When he again made his appearance in the House, in the end of May, 1777, it was to reiterate with increased earnestness his views and warnings on American affairs; and he continued to come down for the same purpose during the next session as often as the little strength remaining in his racked and shattered frame would permit. At last, on the 7th of April, 1778, after he had spoken once on a motion for an address to the king on the state of the nation, he attempted to rise again to notice something that had been said by the duke of Richmond in reply, when he dropped senseless into the arms of those beside him. He was carried home to his house at Hayes, in Kent, but never again rose from his bed, and died on Monday, the 11th of May, in the seventieth year of his age.

All the enthusiasm which had been stirred by his name in former days was revived for the moment by the death, in circumstances so affecting, of the orator and statesman who for more than forty years had filled so large a space in the public eye, and whose memory was associated with so much of popular principle and national glory; and to a funeral and a monument in Westminster Abbey at the public expense, were added the more substantial rewards of a grant of twenty thousand pounds for the payment of his debts, and a pension of 4000*l*. a year to his descendants.

As to Lord Chatham's real claims, either as an orator, a minister, or a patriot, we may observe in general that in each of these capacities he appears to have been at best the man merely of his own time. His eloquence, of the immediate effects of which there can be no question, must have partaken very much of the only half-intellectual art of acting, and been indebted for its power to his voice, his eye, and other mere external advantages, as much as to any higher qualities. At least no report that has come down to us of any of his speeches conveys an impression at all answering to their traditionary fame. Earnestness and fervour there is, as well as clearness and distinctness, with occasional point or happy aptness of expression; there is generally forcible reasoning, and a luminous disposition of the subject; but that is nearly all. Lord Chatham's eloquence is rarely irradiated by any imaginative colouring, and is without any remarkable depth or novelty of thought; its ordinary rhetorical characteristic is tawdriness, and its vein of reflection common-place. Indeed it is probably to this last-mentioned quality that it was in great part indebted for its immediate success; it hit the popular or general understanding, as it were, between wind and water. And to this effect also contributed the thoroughly English character of Lord Chatham's mind; a proud love of his country was his master-passion, and her greatness and glory ever the object on which he kept his eye. He was also altogether a public man—amiable and beloved, indeed, in his domestic circle, and both enjoying and returning very cordially the affection of his family, but, as his enemies admitted, free from dissipation of every kind, and having as little of vice or indolence or any other kind of sensuality in his composition or habits as any man of his time. On the subject of his ambition indeed it would be easy to say much, as much has been said; and some of his letters lately published go to show that his love of power was combined not only with great haughtiness of bearing towards his inferiors, but also with no small degree of what would now at least be called subserviency to those above him. But even in regard to this last most unfavourable exhibition which he makes of himself, something is to be allowed for the manners and indeed established etiquette of the age, which in all departments of social intercourse exacted a degree of formality and ceremonious observance which now seems extravagant and ridiculous, and if practised in the present day would really indicate a much greater degree of servility than it then implied. It can hardly be disputed that Chatham, whatever faults he may have had, was essentially a high-minded man, and it is most reasonable, when we find him appearing otherwise in any particular case, to set down the defect as one of manner rather than of character.

The Life of Lord Chatham has been written by Almon, the bookseller, in 3 vols. 8vo., under the title of 'Anecdotes of the Life of the Earl of Chatham;' and much more accurately, as well as fully, by the Rev. Mr. Thackray, in his 'History of the Earl of Chatham,' 2 vols. 4to. Of his own writings nothing has been given to the world except a small volume of letters addressed to the son of his elder brother, afterwards Lord Camelford, which were published a few years ago by the late Lord Grenville, and his 'Correspondence,' in 4 vols. 8vo., which has only very recently appeared. The latter publication abounds in matter illustrative both of the life of Chatham and of the political history of his time. By his wife, who survived till 1803, besides two daughters, he had three sons, the political distinction acquired by one of whom, the subject of the next article, rivalled that of his illustrious father.

PITT, THE RIGHT HONOURABLE WILLIAM, second son of the first earl of Chatham, was born at Hayes, in Kent, 28th May, 1759. His elementary education was conducted at home, under the immediate care of the Reverend Edward Wilson, afterwards canon of Windsor, and anxiously superintended by his father, whose favourite he was, and who early formed high anticipations of the figure he would make in life. He was sent in 1773 to Pembroke Hall, Cambridge, where his studies were principally under the direction of Dr. Pretyman (who afterwards took the name of Tomline, and became bishop of Winchester, and the biographer of his distinguished pupil). 'Although he was little more than fourteen years of age when he went to reside at the university,' says Bishop Tomline, 'and had laboured under the disadvantage of frequent ill health, the knowledge which he then possessed was very considerable; and, in particular, his proficiency in the learned languages was probably greater than ever was acquired by any other person in such early youth. In Latin authors he seldom met with difficulty; and it was no uncommon thing for him to read into English six or seven pages of Thucydides, which he had not previously seen, without more than two or three mistakes, and sometimes without even one.' Mr. Pitt was probably very well taught when he came up to the university; but this way of stating the matter only shows that the bishop's own scholarship was small.

After leaving Cambridge, Mr. Pitt visited France, and studied for a short time at Rheims. On his return to England, being intended for the profession of the law, he entered himself of Lincoln's Inn; and he was called to the bar in 1780. But after having gone the western circuit only once or twice, he was returned to parliament for the borough of Appleby, the patron of which was then Sir James Lowther (afterwards earl of Lonsdale); and from this date his original profession was given up for the House of Commons and a political career.

He took his seat on the 23rd of January, 1781, and his first appearance in debate was on the 26th of February following, on the motion for the second reading of Mr. Burke's famous bill for the regulation of the civil list establishments. He gave his hearty support to the measure, 'and,' says the report, 'in a speech directly in answer to matter that had fallen out in the course of the debate, displayed great and astonishing powers of eloquence. His voice is rich and striking, full of melody and force; his manner easy and elegant; his language beautiful and luxuriant. He gave in this first essay a specimen of eloquence not unworthy the son of his immortal parent.' He afterwards spoke repeatedly on the side of the opposition in the course of this and the following session, before the termination of which it may be said that he had taken his place with Burke, Fox, and Sheridan (the last also a member of only the same standing with himself), in the front rank of the debaters of the day.

It was on the 7th of May, 1782, a few weeks after the fall of the North and the appointment of the second Rockingham administration, that Mr. Pitt made his first motion for the reform of the representation of the people. The motion was defeated by an inconsiderable majority; but the mover continued for some years after this to advocate, if not to hold, the principles or opinions which he announced on this occasion. At this date indeed he was so zealous a friend of reform as to take a leading part in some proceedings out of doors for the promotion of that object.

The death of the Marquis of Rockingham in the beginning of July having dissolved the administration of which he was the head, and that of Lord Shelburne having succeeded, Mr. Pitt was appointed to office and to a seat in the cabinet, as chancellor of the exchequer, having just entered his twenty-fourth year. This was the administration to which it was left to finish the contest that had arisen out of the attempt to tax the Americans, by acknowledging the independence of the United States, and concluding peace with France and Spain. It was assailed upon these and various other grounds by the famous coalition formed between the adherents of the two immediately preceding ministers, as respectively represented by Lord North and Mr. Fox; and the issue was, that in March, 1773, Lord Shelburne and his colleagues were driven from office by the united force of this new opposition, and a cabinet was formed, nominally under the premiership of the Duke of Portland, but in which the chief power was actually lodged in the hands of North and Fox, who were appointed secretaries of state. The alliance of whigs and tories however, which had carried this victory, was now opposed by another body of similar composition, formed by the Shelburne whigs and the tories who, seceding from North, professed themselves the friends and supporters of the court, which was well understood to bear with impatience the yoke of the new ministry. Of this opposition Pitt was the recognised leader in the House of Commons. Among other manœuvres to which he had recourse with the view of annoying and damaging the government, was the renewal of his motion for parliamentary reform. The effect, as had been anticipated, was to array Fox and North against each other in the debate and the division; but the motion nevertheless was negatived in rather a full house by a majority of nearly two to one. The serious opposition to the government did not begin till the next session, when Fox brought forward his India bill; but even that measure was carried through all its stages in the House of Commons by great majorities, and only encountered a formidable resistance when it reached the Lords, where all the personal influence of the king was exerted to procure its defeat. This object being attained, his majesty, with his characteristic decision, followed up his advantage by dismissing Mr. Fox and Lord North, when they would not resign, and by appointing Mr. Pitt prime minister, with the offices of first lord of the treasury and chancellor of the exchequer. This was in the middle of December, 1783.

The state of parties was now very extraordinary, and gave rise to the most remarkable contest in the history of parliament. In the House of Commons the force of the opposition very considerably outnumbered that of the government, even after all the impression that the influence of the crown had been able to make upon the ranks of the former; so that if the issue of the struggle had depended solely upon that assembly, it could not have been doubtful or long deferred. But, if Mr. Pitt had the representatives of the nation against him, he had decidedly the nation itself on his side, and with this, backed by the support of the crown, his position was impregnable, for, if it came to the worst, a dissolution could in a moment put an end to the existence of the present House of Commons, and secure another in accordance with the prevailing popular feeling. Such an appeal to the people however was for obvious reasons far from palatable to the crown, and not to be resorted to if it could be avoided, although in this case the circumstances were as favourable for such an experiment as they could ever be expected to be, the permanent body of the House of Lords, whose union with the Commons might have considerably strengthened the latter, being already ministerial by a steady though not a very large majority. Theoretically, indeed, the crown might have made a majority for itself in that branch of the legislature more directly than in the other house; but practically, a creation of peers for such a purpose would have been a more violent and unconstitutional measure than a dissolution in any circumstances, and, ventured upon contemporaneously with a dissolution, would have been a wholly unexampled stretch of the prerogative, the effect of which upon the public mind probably would have been to counteract all the good effects that were to be hoped for from the other expedient. The policy which Mr. Pitt adopted was very masterly, and it was carried out with a steadiness and courage which would have been wonderful in the most veteran statesman. He did not dissolve the parliament immediately, but first suffered the opposition to waste their strength and damage themselves in the public opinion to an infinitely greater extent than ever by a long succession of infuriated and unavailing attempts to drive him from office; and then, when, after a battle which lasted for three months, he had reduced their majority from between fifty and sixty to one, he sent them back to their several constituencies, to be one-half of them rejected at a new general election. About 160 of them in fact lost their seats, and were dismissed to private life, with little to console them in their retirement except the name they received of 'Fox's Martyrs.'

Mr. Pitt's biography from this date is little else than the history of the public affairs of the kingdom so long as he lived. He continued at the head of the ministry which this great victory had established in power, for about seventeen years—a most eventful and important period, in the course of which the relations of parties were altogether changed, and this country and Europe were suddenly and violently translated from a state of profound peace into the most general and most convulsive war that had been known in modern times. [Bonaparte; Burke; George III.] The elder Pitt, as we have seen in the last article, owes his chief fame as a minister to his conduct of the war in which he found the country involved on his first accession to power; but it has been generally thought unfortunate for his son's political reputation that he should have been transformed from a peace into a war minister. In point of fact, the nation certainly continued to make a very steady economic progress during the first nine peaceful years of his administration, and the military results of the last eight were on the whole decidedly disastrous. During the former period the trade of the kingdom was estimated to have increased by very nearly a third; and in the five years from 1783 to 1788, the revenue had received an augmentation of 5,000,000*l.*, of which not more than 1,500,000*l.* was calculated to have arisen from new taxes. At the same time the expenditure was not greater in 1790 than it had been in 1784, being in both years under 12,000,000*l.* The establishment of a new constitution for the East India Company (1784), the establishment of a new sinking fund (1786) [NATIONAL DEBT, xvi., p. 100], the arrangement of a commercial treaty with France on very liberal principles (1786), the consolidation of the customs (1786), acts passed for the relief of the Roman Catholics in England, Scotland, and Ireland (1791, 1792), besides various minor measures for the suppression of smuggling, were the administrative innovations that chiefly distinguished this period, and that were understood to owe their origin mainly to the premier. In 1785 Mr. Pitt also once more brought forward the subject of the amendment of the representation of the people in parliament; but he did not call in the aid of his authority as minister to ensure the success of his motion, which was negatived by a considerable majority, and which he never renewed. Afterwards, when the question of reform was taken up by the Society of the Friends of the People, and brought forward at their instance by Mr. (now Lord) Grey, the proposal found in Mr. Pitt one of its most determined opponents. To the exertions that were now begun to be made for the abolition of the slave trade, he lent the aid of his eloquence and of his own vote; but upon this question also he declined to use his power or influence as the head of the government. He took much the same course in regard to the prosecution of Warren Hastings, and the correction of the abuses of the Indian government. All the measures, it may be observed, to which Pitt gave only this kind of support, failed of success during his administration.

One of the most remarkable of the contests and victories that illustrate this first period of his government, occurred in the session of 1788-9, when he successfully maintained against Mr. Fox the right of parliament to supply the temporary defect of the royal authority occasioned by the incapacity of the reigning king—a right which seems to be now received as an established doctrine of the constitution.

Almost the only memorable legislative measure of the latter years of Mr. Pitt's first ministry was the union with Ireland, which was effected in 1799. It is now known that the disappointment of the expectations which he considered himself entitled to entertain of the abolition, or at least very great mitigation, of the penal and disabling laws affecting the Roman Catholics, was the reason which he assigned to the king for retiring from office soon after the passing of this measure. He and his friends resigned in March, 1801.

For some time Mr. Pitt gave his support to the administration of his successor Mr. Addington; but when the rapidly growing conviction of the incompetency of the new cabinet began to foretel its speedy downfall, he joined in the general cry against it, and the result was that in May, 1804, he became again prime minister. He remained at the head of affairs till his death, on the 23rd of January, 1806, the consequence partly of a wasted constitution, partly, it is generally believed, of a broken heart. The overthrow of the new coalition which he had succeeded in forming against France by the series of successes achieved by that power in the latter part of the year 1805, is supposed to have combined with the vexation arising from the impeachment of his friend Lord Melville to destroy him. He had for some years been accustomed to stimulate his overtaxed powers of body and mind by a lavish indulgence in wine; and this habit also no doubt had its share in shortening his days.

The public bearing of Mr. Pitt was cold and lofty; but he is said to have unbent himself very gracefully among his intimate friends, and the few who really knew him well seem to have been strongly attached to him. Whatever were his faults, there was no meanness in his character. As to the merits of his general system of administration, opinion is still nearly as much divided as ever. With regard to the character of his oratory there is perhaps beginning to be a more general agreement; and we may venture to say, without incurring the chance of any very loud or extended dissent, that, imposing and effective as it was at the moment of delivery, it owed its success as much to the impression which it made upon the ear, and to what we may call its mere mechanical qualities, as to any diviner inspiration. It wanted even the earnestness and occasional fire of his father's eloquence; and of either splendour of imagination or any remarkable depth or force of thought, it must be admitted to have been nearly destitute. Its highest quality appears to have been a power of sarcasm, which was the proper expression of a nature like that of Pitt, cold, proud, and contemptuous, and having little sympathy either with the ordinary vices and weaknesses, or with the better feelings and enjoyments, of his fellow-men.

PITTA, M. Vieillot's name for a genus of remarkable birds, placed by Mr. Swainson among the *Myiotherinæ*, or *Ant-Thrushes*. [MERULIDÆ, vol. xv., p. 122, where the generic character of the genus and that of the subgenera *Chlorisoma* and *Grallaria* are given.]

Pitta. (Vieill., Temm.)

M. Lesson remarks that, under the name of *Myiothera*, Illiger and Cuvier united the *Brèves* of Buffon and the *Ant-Thrushes* properly so called. These *Brèves* are remarkable, he observes, for the vivid colours of their plumage, their long legs, and their very short tail. They are only found, he adds, in the Malaisian Islands, whilst the *Ant-Thrushes* belong to the New Continent as well as to the Old World.

Mr. Swainson notices the genus *Pitta* as one of remarkable beauty, and observes that they have the gradually-curved bill of the true thrushes, but much stronger. 'The predominant colour of their plumage,' continues Mr. Swainson, 'is green, the sides of the head and wings being generally variegated with vivid blue; some species have a hood of black, and all are confined to New Holland and the neighbouring isles of the Indian Seas. America indeed presents us with a representation of these genera, in the subgenera *Grallaria*, Vieill., and *Chamæza*, Vig.; but the species are very few, and they are coloured in the homely hues of ordinary thrushes. To this group, as a subgenus, we refer *Chlorisoma*, called by some writers by the barbarous and unmeaning name of *Kitta*. The bill is clearly that of a thrush, while the legs place it among the *Myotherinæ* (*Myiotherinæ*), of which it seems to be the rasorial subgenus, both on account of its size, its crest, and its affinity to *Myophonus*. There are two or three species, all natives of India.'

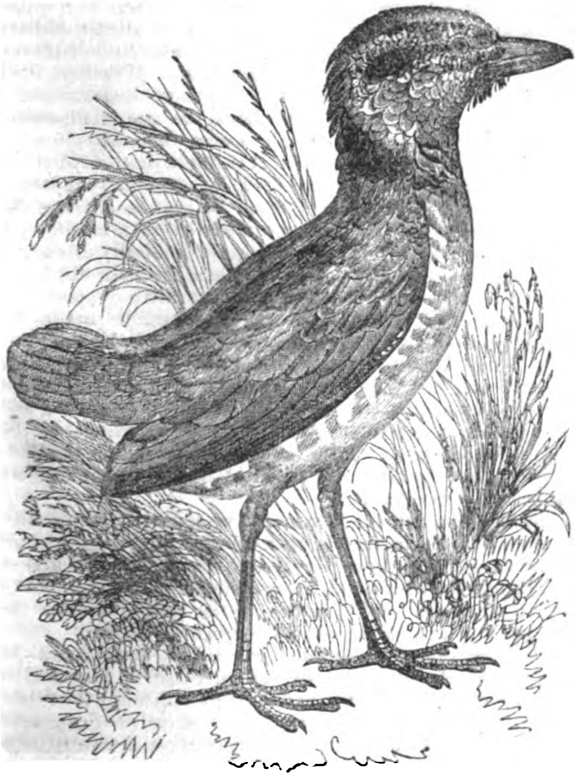
'The genus *Myothera*, on the other hand, is chiefly restricted to tropical America, and comprises numerous species of a smaller size, clothed in dark colours, but prettily variegated with white. Although distinctly separated from the Oriental group by their abruptly-hooked and strongly-toothed bill, they are yet so intimately allied to the small bush-shrikes (*Thamnophilinæ*) that it is almost impossible to draw a distinction between them.'

'Of all the tribes of insects which swarm in the tropics the ants are the most numerous; they are the universal devastators, and in the dry and overgrown forests of the interior the traveller can scarcely proceed five paces without treading upon their nests. To keep these myriads within due limits, a wise Providence has called into existence the ant-thrushes, and has given to them this particular food. Both are proportionate in their geographic range, for, beyond the tropical latitudes the ants suddenly decrease, and their enemies, the *Myotheræ*, totally disappear. As a general distinction by which this family may be known from the bush-shrikes, we may mention the difference in the feet,—the structure of one being adapted for walking, while that of the other is more suited for perching. The ant-thrushes are very locally distributed; for, although the group is tropical, we frequently found that a particular species, very common in one forest, was replaced in another by a second; while a third locality in the same district would present us with still another kind, different from those we had previously found. Cayenne and Surinam, in like manner, furnish us with many species totally unknown in the forests of Brazil.'

To return to *Pitta*. We select, as an example, *Pitta Gigas*, *Brève Geant*, or *Giant Pitta*.

Description.—Size equal to that of a magpie, but the tail is short and squared, and the wings cover it entirely. A very brilliant azure blue covers the back, the scapulars, the rump, and tail; a less vivid tint is spread over the wings, the quills of which are black, coloured with azure towards the tips; summit of the head, nape and demi-collar of the lower part of the neck black; feathers of the front and eyebrows ashy-brown; throat whitish; an ashy-brown tint is spread over all the lower parts; the feet are very long and of a horny ash-colour. Total length nine inches.

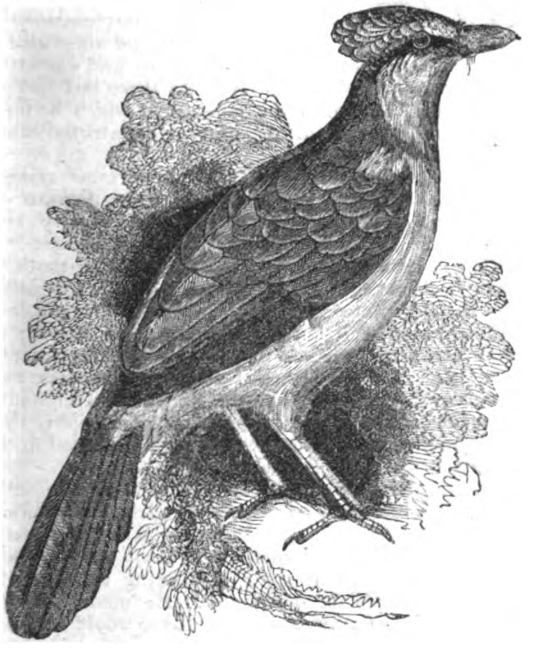
Locality.—Sumatra. (Temm.)



Pitta Gigas.

Chlorisoma. (Sw.)

Example, *Chlorisoma thalassinum* (*Kitta thalassina*, *Piroll Thalassin*, Temm.).



Chlorisoma thalassinum.

Description.—Greater part of the plumage very brilliant celadon-green; a velvety black band springs at the angle of the bill, passes backwards so as to include the eye, and surrounds the occiput; tail deep tarnished green, wings reddish, but the three or four secondary feathers nearest the body are opaline bluish ash; iris, bill, and feet very bright vermillion red. Total length eleven inches two or three lines.

The *male* and *female* have nearly the same livery.

The young of the year differ in the colour of their bill and feet, which are black; in that of the wings, which is a tarnished rusty red, and in the very clear blue, which is nearly whitish, of all the rest of the plumage. This blue tint is more vivid in middle age, and passes by degrees from bright azure blue to celadon-green. Individuals during moult have the plumage varied with these two tints very vivid and pure.

Localities.—Java and Sumatra. (Temm.)

Grallaria. (Vieill.)

Example, *Grallaria Rex* (*Roi des fourmilliers*, Buff.; *King Thrush*, Lath.; *Turdus Rex*, Gmel.).

Description.—Brown, inclining to red, lighter beneath; occiput plumbeous; forehead varied with black and white.

Locality.—South America, Guiana, and Brazil especially.

Grallaria Rex.

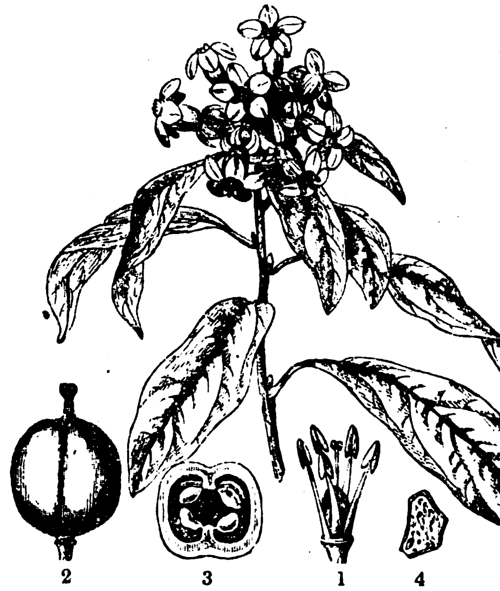
PITTACAL, one of the ingredients of wood-tar, and so named by Reichenbach, who discovered it, from *πίττα*, *pitch*, and *κάλλος*, *ornament*, on account of its fine colour. When a little barytes-water is added to impure picamar, or to oil of tar deprived of its acid, the liquor directly becomes of a fine blue tint, which very soon passes into the colour of indigo: like this pigment, it assumes a copper colour when rubbed, and according to its purity becomes afterwards golden or brass yellow.

Pittacal is inodorous, tasteless, and not volatile; at a high temperature it is decomposed and charred, but does not give out ammonia. It is suspended in water in so fine a state of division, that it passes through filters and gives a blue colour to the water, but it does not dissolve in it; light and air do not act upon it; it is insoluble in alcohol and æther; it dissolves in cold diluted sulphuric and hydrochloric acid; acetic acid also dissolves it readily, and the solution is of a fine red colour; alkalis restore the blue colour; nitric acid decomposes it. Reichenbach states that it is a more delicate test of acids and alkalis than litmus.

PI'TTACUS, one of the so-called seven wise men of Greece, was the son of Hyrradius, and born at Mitylene in the island of Lesbos, about the year 652 B.C. Nothing is known of his education and the early part of his life, and the first facts which his biographer, Diogenes Laertius, mentions are, that, with the assistance of the brothers of Alcæus, he delivered his native island from the tyranny of Melanchrus (B.C. 612), and that when the Mitylenæans were involved in a war with the Athenians about the possession of the town of Sigeum on the Hellespont, Pittacus gained the victory over the Athenian general Phrynon by a singular stratagem. He came into the field armed with a casting-net, a trident, and a dagger, and first entangled and then despatched his adversary (B.C. 606). In this war Alcæus left his shield a trophy to the enemy. It must have been soon after this war that Mitylene was distracted by the two political parties which about this time began to appear in various parts of Greece. The aristocratic party, to which Alcæus and his brother Antimenidas belonged, was driven from the town, and the popular party unanimously elected Pittacus to the office of æsymnetes to defend the constitution. During his administration, which lasted from 590 to 580 B.C., he overcame his adversaries, and gained them by his clemency and moderation. Even Alcæus, who had assailed him in his poems with the greatest bitterness, became reconciled. Pittacus regulated the affairs of his country by the most salutary laws and institutions, and in B.C. 580 he voluntarily resigned his office and withdrew from public life. Valerius Maximus (vi. 5, ext. i.) erroneously states that Pittacus was made æsymnetes at the time of the war with the Athenians for the purpose of conducting it: but this is sufficiently refuted by the authority of Strabo, the fragments of Alcæus, and Diogenes Laertius. Pittacus passed the last ten years of his life in quiet retirement, enjoying the esteem and love of the best and wisest of his countrymen; and when the Mitylenæans wished to reward him for his services with an extensive tract of territory, he refused to accept it for himself, but had it made consecrated ground, which to the time of Diogenes Laertius retained the name of the grounds of Pittacus. He died in B.C. 570, at the age of 82.

He was the author of a considerable number of elegies, of which a few fragments are still extant. Diogenes Laertius has preserved a short letter ascribed to Pittacus, and addressed to Crœsus, king of Lydia, which contains an answer to an invitation of the king to come to see his magnificent treasures. Many of the numerous maxims of practical wisdom current among the antients were ascribed to Pittacus, and are preserved in the works of Diogenes Laertius, Plutarch, Ælian, and others.

PITTOSPORA'CEÆ are polypetalous exogenous plants with a definite number of hypogynous stamens, a superior one- or two-celled ovary, which in the former case has parietal placentæ, numerous ovules, a single style, and hard seeds containing a very small embryo in the region of the hilum. Their position in a natural arrangement is unsettled, but appears to be near the Vitaceous order, rather than the Rhamnaceous or Polygalaceous. All the species contain in greater or less abundance a resinous substance, the use of which is unknown. Many of the species are pretty shrubs or bushes, sometimes extremely graceful, but they are of no known use. Most of them are natives of Australia. The names of Sollya and Billardiera recal to the mind some of the prettiest twiners of the greenhouse.



Pittosporum Tomentosum.

1, the stamens and pistil; 2, a ripe fruit; 3, the same divided transversely; 4, a section of a seed with the minute embryo near the base.

PITTS, WILLIAM. The very recent death of this highly-gifted artist prevents our attempting a biography, for which the materials are not yet collected. Still, rather than entirely pass over the name of one who will henceforth be known as one of the greatest among British artists, we content ourselves with giving a brief record of him.

He was born in London, in the year 1790, and brought up by his father to his own business, which was that of a chaser, or what would have been termed in Italy an *orefice*, a branch of art now regarded as little better than a mechanical one, and accordingly turned over almost entirely to artisans, although it was that in which Cellini displayed his mastery and earned his reputation. Whether Pitts subsequently studied under any sculptor we do not know.

His very early marriage, at about the age of nineteen, would seem to indicate that he was even then following his profession on his own account. It is likely that for what instruction in sculpture he ever had, he was chiefly indebted to Flaxman, for he was employed by him in chasing the shield of Achilles, designed and modelled by himself. Indeed there seems to have been great similarity of feeling and taste between Pitts and Flaxman, for both displayed their talents in poetical subjects and extensive compositions consisting of a number of figures. As a counterpart to the shield of Achilles by the one, may be placed the shield of Æneas by the other; also the shield of Hercules, from Hesiod, and the Brunswick shield, which is a large circular relief, representing George IV. in a car in the centre, and in the other compartments the principal events of the House of Hanover. Pitts was also employed on the Wellington shield, which was executed under the immediate inspection of Stothard.

By way of parallel to Flaxman's two series of designs from Homer and Dante, may be mentioned similar graphic compositions by Pitts from Virgil and Ossian, only the first of which has been engraved, being etched by himself in 1831; as yet they are hardly known to the public, whereas the designs of Flaxman are known throughout Europe.

Both for the exquisite fancy which they display and for their masterly graces of execution, some of his smaller subjects in relief have obtained for Pitts with many the title of the 'British Cellini.' Yet, except as indicative of congenial fancy and artistical power, such appellation is utterly inappropriate, hardly any two individuals being so utterly dissimilar in personal character as the arrogant and daring Benvenuto and the meek and unassuming William Pitts, who was an enthusiast entirely devoted to his own art, and utterly unskilled in the art of winning his way to popularity and fortune. Hence it is matter of regret rather than surprise that he should not have obtained patronage at all in proportion to his ability and his genius; or that he encountered many disappointments, and was latterly involved in embarrassments. How far these last had any share in impelling him to the fatal act by which he terminated his life, it is difficult to judge. He destroyed himself by poison, April 16, 1840.

The following is a list of his chief productions, arranged according to their dates:—The Deluge, 1823; Samson slaying the Lion; the Creation of Eve; Herod's Cruelty, 1824; a Chariot-race, 1826; the Pleiades; Shield of Æneas, 1828; the Rape of Proserpine, and the Nuptials of Peirithous, two bas-reliefs, about eight feet long, executed for Mr. Simmons, of the Regent's Park, 1829; the Brunswick Shield, 1830; the Apotheoses of Spenser, Shakspere, and Milton; and another series of reliefs in two of the drawing-rooms at Buckingham Palace, 1831; the Shield of Hercules, 1834; a long bas-relief or frieze of all the English sovereigns from the Conquest, 1837; a design for a masonic trophy, 1839; the Triumph of Ceres, and a small subject modelled in wax, exhibited at the Royal Academy, 1840.

Whatever difference of opinion may exist with regard to Pitts' talents, there can only be one opinion as to his enthusiastic devotion to his profession, when it is known upon good authority that he sometimes had not his clothes off for a fortnight together, snatching during all that while only short intervals for bodily rest. He used to observe that even a day of eminence as a sculptor would not be too dearly purchased by a life of anxious toil.

In addition to the works above enumerated, may be mentioned two of his latest performances, the 'Kemble Tribute,' presented to C. Kemble, Esq., and a vase, executed for her majesty, as a sponsal present by her, of exquisite design as to its general form, and poetically embellished with groups in relief, signifying Birth, Infancy, Instruction, Education, and Love.

PITTSBURG. [PENNSYLVANIA.]

PI'TYLUS. [TANAGRINÆ.]

PITYRIA'SIS (from πίτυρον, bran) is a disease of the skin in which irregular patches of the cuticle appear covered with thin bran-like scales or with particles of a fine white powder, which, as fast as they fall off, are succeeded by others. It may be regarded as a morbid excess of the natural process of desquamation which is constantly going on, and by which the old cuticle is removed from the surface of the body to be replaced by that of more recent formation. [NUTRITION.] The commonest form of this disease is that called Pityriasis capitis, or dandriff. It affects chiefly the scalp and eyebrows, and is most frequent in children, in whom it originates either from generally disordered health or from mere neglect of cleanliness. It occurs also on the face and sometimes on other parts of the body in adults and old persons after exposure to the sun or a cutting wind, and it usually accompanies the commencement of baldness. The only local treatment which is necessary or useful is frequent washing and the application of some mild and simple ointment.

In the other forms of Pityriasis the discolouration of the cuticle is a more prominent sign than its desquamation in fine scales. The P. versicolor occurs in the form of irregular yellow or light brown patches, which are chiefly situated on the front of the chest and abdomen, and are commonly called liver-spots or tan-spots. The extent and form which such spots present are infinitely various; but though they sometimes exist unaltered for several years, they rarely produce any inconvenience beyond a slight itching. The P. rubra is an aggravated form of the preceding; the spots are more or less brightly red, and are the seats of considerable irritation. In the P. nigra the essential part of the disease, which is of very rare occurrence, is the production of a cuticle of nearly a black colour. It may be doubted whether it deserves to be regarded as a variety of Pityriasis, or whether the few cases that have occurred are not merely examples of the production in Europeans of cuticle similar to that which belongs naturally to negroes and other coloured nations, and of which the formation has been observed as often on apparently healthy as on diseased skin.

PITYU'SÆ. [BALEARIC ISLANDS.]

PIUS I., a native of Aquileia, succeeded Hyginus as bishop of Rome, A.D. 142. Little is known of him. Several decretals have been attributed to him by Gratian, but they are generally considered apocryphal. Pius died in the year 157, and was succeeded by Anicetus.

PIUS II., Æneas Sylvius Piccolomini, born in 1405, at Corsignano in the state of Siena, succeeded Calixtus III. in 1458. He was a man of extensive learning, and had distinguished himself in the Council of Basle, A.D. 1431-39—that celebrated assembly which attempted earnestly, though with little success, the reformation of the Church, and in which Piccolomini acted as secretary, and of which he wrote a history, 'Commentarius de Gestis Basil. Concilii,' in two books, a very important work for the history of the Church. At that time Piccolomini was a strong advocate for the supremacy of the Council and its right to judge and even depose the pope, 'who,' he argued, 'ought to be considered as the vicar of the Church rather than as the vicar of Christ.' These tenets however were condemned by Eugenius IV., but the Council asserted its authority by suspending the pope from his dignity; and then began a long struggle, which terminated in an open schism, the Council deposing Eugenius and electing Felix V. [AMADEUS VIII.] Piccolomini was appointed secretary of the new pope or antipope, and was sent by him as his ambassador to the emperor Frederic III., who was so pleased with him, that he prevailed upon him to give up his precarious situation and accept the place of imperial secretary. Frederic afterwards sent him on several missions and loaded him with favours. Piccolomini was not ungrateful; he wrote several works in praise of his patron and in support of his imperial prerogative—'De Origine et Auctoritate Romani Imperii ad Fridericum III. Imperatorem, Liber Unus;' 'Historia Rerum Friderici III.;' 'De Itinere, Nuptiis, et Coronatione Friderici III. Commentariolus;' 'De his, qui Friderico III. Imperante, in Germaniam, et per totam Europam memorabiliter gesta sunt, usque ad annum 1458, Commentarius.' At last Frederic sent Piccolomini as his ambassador to Pope Eugenius. This was a delicate errand for him who had been one of the avowed antagonists of that pontiff; but he managed so well by his dexterity, his captivating address, and, above all, his eloquence, that the pope not only forgave him, but became his friend, and Piccolomini had hardly returned to Germany from his mission, when he received a papal brief appointing him apostolic secretary. He accepted an office congenial to his clerical profession, and also as the means of fixing his residence in Italy; but he still retained a lively sense of gratitude towards his Imperial benefactor. From that time a marked change took place in the opinions, or at least in the professions, of Piccolomini, and he became a stout advocate for the claims of the see of Rome. Meantime Eugenius died, A.D. 1447, and his successor, Nicholas V., was recognised by the Fathers of the Council of Basle, who, being forsaken by both the emperor and the French king, made their peace with Rome. Felix V. also having abdicated in favour of Nicholas, the schism of the Church was healed. Nicholas made Piccolomini bishop of Trieste, and afterwards of Siena, and sent him as nuncio to Germany and Bohemia, where he had several conferences with the Hussites, which he relates in his Epistles. (*Epistola* 130.) He had however the merit (rare in that age) of recommending mild and conciliatory measures as the most likely to reclaim dissenters to the bosom of the Church. He wrote a work on the history of Bohemia and the Hussites, in which he states fairly and without any exaggeration the tenets of that sect, as well as those of the Valdenses, which he calls 'impious,' but which are mainly the same that have since been acknowledged by the Protestant and Reformed churches throughout Europe. He relates the burning of John Huss and Jerome of Prague, and speaks of their fortitude, 'which,' he says, 'exceeded that of any of the philosophers of antiquity,' and he recapitulates literally their charges against the corruption of the clergy. (Æneæ Sylvii *Historia Bohemica.*)

In the year 1552, Piccolomini, being then in Italy, was present at the solemn coronation of Frederic III. at Rome, and delivered an oration to the pope in the name of that sovereign, whom he afterwards accompanied to Naples. On their return to Rome, he delivered another oration before the pope, the emperor, and other German and Italian princes, and the ambassadors of other European courts, for the purpose of exhorting them to form an effectual league against the Turks, who were then on the point of taking Constantinople. Piccolomini felt the great danger to Christian Europe from the rapid advance of the Ottoman conquerors, and his paramount object through the remainder of his life was to form a strong bulwark to protect Italy and Germany; but at the same time he was too well acquainted with the politics of the various Christian courts, and their selfish and petty jealousies, to expect much union in their councils, and he expresses his views and his doubts in a masterly manner in several of his Epistles.

Calixtus III., the successor of Nicholas V., made Piccolomini a cardinal, and in 1458, after the death of Calixtus, he was unanimously elected pope by the name of Pius II. His pontificate lasted only six years, but during this period he distinguished himself by promoting learning, by inculcating peace and concord among the Christian princes, and exhorting them to unite their efforts against their common enemy, the barbarous Turks. Machiavelli, a writer not very favourable to the court of Rome, says that 'Pius showed himself mindful above all of the welfare of Christendom and of the honour of the Church, independent of any private passion or interest of his own.' (*Storie Fiorentine*, b. vi.) The year after his election he convoked a congress of the ambassadors of all the Christian sovereigns to arrange the plan of a general war against the Ottomans. The pope himself repaired to Mantua, accompanied by the learned Philelphus, who spoke eloquently in favour of the proposed league. Most of the Italian states were willing to join in it, but Germany and France stood aloof, and nothing was decided. Pius assisted Ferdinand, king of Naples, in his war against the duke of Anjou, the pretender to that crown. At the same time he was obliged to make war in his own states against Sigismondo Malatesta, lord of Rimini, and against the Savelli and other feudal barons, and he was successful. By a bull addressed to the universities of Paris and of Cologne, Pius condemned his own writings in defence of the Council of Basle, concluding with these words: 'Believe what I, an old man, now say to you, and not what I wrote when I was young; believe the pontiff rather than the private individual; reject Æneas Sylvius, and accept Pius II.' (*Bulla Retractionum omnium Dudum per eum in Minoribus adhuc agentem pro Consilio Basiliensi et contra Eugenium summum Pontificem Scriptorum*, Colonia, 1468.) In several of his letters to his friends also, and especially to Pietro di Noceto, he expresses sorrow for his juvenile weaknesses, for he had once been too fond of the fair sex, and had even written accounts of some of his amorous adventures and of those of other persons, which are found among his Epistles.

A vacancy having occurred in the archiepiscopal see of Mainz, two candidates appeared for it, Adolph, count of Nassau, and Dietrich of Isemberg. The latter had the majority of votes, but Pius, who by the concordat had the right of deciding in cases of contested elections, refused to confirm the choice of Dietrich unless he engaged not to assert the supremacy of a general council, not to convoke of his own authority an imperial diet, and further to pay to Rome double the sum fixed for the annates, or first fruits. Dietrich demurred to the first two conditions, and positively refused to accede to the last, and as proceedings were instituted against him in the apostolic court, he appealed to the next general council. Pius declared such appeals to be heretical, and excommunicated and deposed him, appointing Adolph of Nassau in his place. The emperor acknowledged Adolph, but Dietrich being supported by the Count Palatine and the elector of Bavaria, a war ensued, which, after much mischief, ended in the submission of Dietrich. Those who remembered the sentiments of Piccolomini when imperial secretary, and especially his letter (*Epistola* 25) to the Papal nuncio John Carvaia, concerning the supremacy of the council, were inclined to think that change of station had, in him as well as in most men, produced a corresponding change of opinions. Pius took also the pains to write a long letter to Sultan Mahomet II. to convince him of the errors of Islamism, and to induce him to turn Christian.

In the year 1464 an armament intended against the Turks was directed to assemble at Ancona, and soldiers began to repair thither from various parts. Matthias, king of Hungary, and Charles, duke of Burgundy, had promised to be of the expedition. The Venetians also had promised the use of their fleet to forward the troops across the Adriatic into Albania. Pius II. set off from Rome for Ancona, but on arriving there he found that the soldiers were in want of arms, clothes, and provisions; the foreign princes did not come; and instead of the Venetian fleet, only a few galleys made their appearance. The aged and disappointed pontiff fell ill, and on the 14th of August he expired, after having taken leave of his cardinals and begged forgiveness if he had erred in the government of the church. He was generally regretted, especially throughout Italy. He was succeeded by Paul II. Pius II. before his death raised his native town, Corsignano, to the rank of a bishop's see, and gave it the name of Pienza, by which it is now known.

As a learned man and a writer he is best known under the name of Æneas Sylvius, the most important part of his career being passed before he was elected pope. He was one of the first historians of his age, a geographer, a scholar, a statesman, and a divine. He was also a great traveller by sea and by land: he lived many years in Germany, he repeatedly visited France, went to Great Britain and as far as Scotland, and to Hungary. His biographer, Campanus, bishop of Arezzo, speaks at length of his peregrinations, and his diligence in informing himself of everything worth notice in the countries which he visited. His principal works, besides those already mentioned, are: 1, 'Cosmographia, vel de Mundo Universo Historiarum,' liber i. (a second book treats especially of Europe and its contemporary history); 2, 'In Antonii Panormitæ de Dictis et Factis Alphonsi Arragonum Regis, libros quatuor, Commentaria;' 3, 'Epitome supra Decades Flavii Blondi Forliviensis, ab inclinatione Imperii usque ad tempora Johannis XXIII., Pont. Max.,' in 10 books; 4, 'Historia Gothica,' published first at Leipzig in 1730; 5, 'A Treatise on the Education of Children, with Rules of Grammar and Rhetoric;' 6, lastly, his numerous 'Epistles,' which contain much varied information. A collection of his works was published at Basle: 'Æneæ Sylvii Piccolomini Senensis Opera quæ extant,' fol., 1551; but this edition does not include all. Domenico de Rossetti has published a catalogue of all his works and their various editions, and also of his biographers and commentators: 'Serie di Edizioni delle Opere di Pio II., o da lui intitolate,' Trieste, 1830. Biographies of Pius II. by Platina and Campanus are annexed to the Basle edition of his works, but a much more ample biography is found in the Commentaries published at Frankfort, 1614, under the name of John Gobellinus, his secretary, but which are known to have been written by himself or under his dictation: 'Pii II., Pont. Max., Commentarii Rerum Memorabilium quæ Temporibus suis contigerunt,' libr. xii., with a continuation by his intimate friend James Ammanato, cardinal of Pavia, who had, at his desire, assumed the name of Piccolomini.

PIUS III., Cardinal Francesco Todeschini Piccolomini of Siena, descended from a sister of Pius II., was elected pope in 1503, after the death of Alexander VI., and died himself in less than a month after his election.

PIUS IV., Giovanni Angelo Medici, or Medichini, of Milan, not of the great Florentine family of Medici, succeeded Paul IV. in 1560. He made his nephew Charles Borromeo a cardinal, who afterwards became celebrated as archbishop of Milan. He instituted proceedings against the nephews of the late pope, Cardinal Carlo Caraffa, and his brother the duke of Paliano, who were accused of various crimes, which were said to be proved against them, and both were executed. But in the succeeding pontificate of Pius V., the proceedings being revised, the two brothers Caraffa were declared to have been unjustly condemned. At Easter, 1561, Pius re-assembled the Council of Trent, which had been prorogued under Paul III. He was particularly intent upon checking the spread of heresy, which had taken root in several parts of Italy, besides the valleys of Piedmont, and especially in some districts of Calabria. The Spanish viceroy of Naples sent his troops, assisted by an inquisitor and a number of monks, to exterminate by fire and sword the heretics of Calabria. Emmanuel Philibert, duke of Savoy, after attacking with an armed force the Valdenses, who made a gallant resistance, agreed to allow them the exercise of their religion within their own districts, subject to certain regulations. The quarrels between the Catholics and Protestants, in France, were more difficult to settle. Some of the French Catholic prelates, among others Monluc, bishop of Valence, and the cardinal of Lorraine, recommended large concessions to be made to the Protestants with the hope of reconciling them to the church, and Queen Catherine de' Medici wrote to the pope to that effect. The pope referred the matter to the council, and in the meantime Catherine published the edict of pacification, in January, 1562, which allowed the Protestants liberty of conscience, and leave to perform their worship in country places, but not within walled towns.

The prelates sent by France to the Council of Trent, and several councillors of the parliament of Paris who were also ordered to attend in the name of the king, spoke loudly of the necessity of an extensive reform in the church, and seemed disposed to render the bishops more independent of the see of Rome. The cardinal of Lorraine was of opinion that the mass and other offices should be performed in the vulgar or popular language of each country; but the Italian prelates, and Lainez, general of the Jesuits, supported the maintenance of the established form of worship, as well as of the papal authority in all its existing plenitude. The discussions grew warm, and it was only in the following year, 1563, that the two parties came to an understanding. [TRENT, COUNCIL OF.] The council terminated its sittings in December of that year, and the pope confirmed its decrees by a bull. This was the principal event of the life of Pius IV. He died in December, 1565. His disposition was generous; and he embellished Rome; but he was charged with the common fault of nepotism.

PIUS V., Cardinal Michele Ghislieri, a native of Alessandria in Piedmont, and a Dominican monk, succeeded Pius IV. in 1566. He had distinguished himself by his zeal in support of the Inquisition, of which tribunal he was one of the leading members. At the same time he was austere in his morals, and wished to enforce a strict discipline among the clergy, and especially the monks and nuns, more than fifty thousand of whom are said to have been at that time living and strolling about Italy out of their respective convents, regardless of any of the obligations enjoined by their order. (Botta, *Storia d' Italia*, b. xii.) There was also a monastic order in Lombardy called the 'Umiliati,' possessed of considerable wealth, the heads of which led openly a most dissolute life, and even kept bravoes, or hired assassins, to execute their mandates. Charles Borromeo, archbishop of Milan, who endeavoured to check these atrocities, was shot at by one of the monks while at prayers in his oratory. The ball however only grazed the skin: the assassin was taken, and revealed his employers; and several preposti, or superiors of convents of the Umiliati, were executed. Pius V., having examined the whole affair, suppressed the order, and gave their property to the Jesuits and other orders.

Pius V. enforced the authority of the Inquisition over all Italy. There were at that time in several towns, especially in Tuscany, some scholars and other men of learning who advocated the doctrines of the Reformation. Some ladies also of high rank, who enjoyed a reputation for learning, such as Vittoria Colonna, Giulia Gonzaga, and Margaret, the wife of Emmanuel Philibert, duke of Savoy, were suspected of a similar bias. Pius demanded of Cosmo, duke of Florence, the person of Carnesecchi, a Florentine nobleman who made a public profession of opinions considered as heretical; being given up to the Inquisition, he was put to death at Rome. The same happened to Palearius, Bartocci, and Giulio Zanetti; the last, who was at Padua, being given up to the pope by the Venetian senate, on the plea that he was a native of Fano and a subject of the Papal State. Numerous informers were kept by the Inquisition in every town of Italy; and such was the terror produced by these severities, that the university of Pisa became almost deserted both by teachers and students. The pope also enforced the strict observance of the index of forbidden books, and enacted severe penalties against those who printed or introduced or kept such books. The printing-presses of Italy, those of Giunti of Florence, and others, declined greatly in consequence, and many printers emigrated to Switzerland or Germany. Pius V. enforced the canons against those priests who kept concubines; but instead of leaving to the civil magistrates the repression of this abuse, he insisted upon the bishops acting both as magistrates and judges, by means of armed men attached to their episcopal courts, and of prisons for the same purpose. This gave rise to frequent collisions between the secular and the ecclesiastical authorities, especially at Naples and Milan. Similar disputes took place concerning the ecclesiastical inspectors and collectors sent by the pope to visit and demand accounts of all church property throughout Italy. Pius proceeded on the principle asserted in the false decretals, that the pope has the disposal of all clerical benefices throughout the world. He also reproduced the famous bull called 'In cœna Domini,' which excommunicates all princes, magistrates, and other men in authority, who in any way favour heresy, or who attempt to circumscribe the ecclesiastical jurisdiction, spiritual and temporal, or to touch the property or revenues of the church; and all those who appeal from the decision of the pope to the general council, as well as those who say that the pope is subject to the council. He ordered this bull to be read every Thursday before Easter in every parish church throughout the Christian world. France, Spain, and the emperor of Germany strenuously resisted the publication of this bull. In Italy the senate of Venice likewise forbade its publication. At Naples and Milan the Spanish governors did the same, but the bishops and monks refused absolution to those who in any way opposed the bull. After much altercation and some mischief, the civil power attained its object, and the bull was set aside. In Tuscany the bull was allowed to be published, but rather as a matter of form than as a measure upon which judicial proceedings could be grounded. The monks and some of the parochial clergy however pretended by virtue of the bull to be exempt from all taxes, and refused the sacrament to the collectors and other revenue officers and their families. The duke of Florence, Cosmo de' Medici, threatened to put the monks in prison and prosecute them. The Tuscan bishops tried to conciliate matters, and to repress the arrogance of the clergy, but the disturbances continued till the death of Pius V. (*The famous Bull 'In Cœna Domini,' published at Rome every Maundy Thursday, against Heretics and all Infringers of Ecclesiastical Liberties*, with a *Preface*, London, 1689.)

By a bull dated August, 1569, Pius created Cosmo de' Medici, who till then had only the title of duke of Florence, grand-duke of Tuscany, and his successors after him, and sent with the bull the model of a crown, ornamented with a red lily, the former ensign of the Florentine republic. Pius was a great promoter of the Christian league against the threatening arms of the Ottomans. After the glorious naval victory of the Curzolari, or of Lepanto, won by the Christian combined fleet against the Turks, in September, 1571, Pius caused Marcantonio Colonna, commander of the Papal galleys, who had distinguished himself in the battle, to make his triumphal entrance into Rome on horseback, preceded by the Turkish captives and spoils, and accompanied by the magistrates, noblemen, and heads of trades of the city of Rome. He ascended the Capitol, and thence proceeded to the palace of the pope, who received him with great honour. The whole scene was like a renewal of the antient Roman triumphs. Pius V. died of the stone, in May, 1572. He was austere and intolerant in his religious opinions, but he was sincere and disinterested, and of unspotted morals; he was learned, and a friend to learning, provided it did not encroach upon matters of belief. It is said that when some one told him that the people of Rome were dissatisfied with the austerity of his discipline, he answered, 'They will be still more grieved at my death:'—and so it was; for that fickle people crowded round his dead body, endeavouring to touch his garments, as if they were relics. The Roman church has numbered Pius V. among its saints. He was succeeded by Gregory XIII.

PIUS VI. (Cardinal Angelo Braschi), a native of Cesena, was elected pope in 1774, after the death of Clement XIV. He was then fifty-five years of age, and had the reputation of being of a generous disposition, and fond of learning and the arts. He had also, besides the advantages of a handsome person, a graceful demeanour and easy and affable manners. In his previous office of treasurer he had managed the financial affairs of the country with wisdom and disinterestedness. The choice of such a man was generally approved. One of the new pope's first acts was to allow greater comforts and indulgence to Father Ricci, the general of the suppressed order of Jesuits, who had been confined in the castle of St. Angelo for some years, though nothing was ever proved against him. Ricci died shortly after, in his place of confinement, in November, 1775, and the pope ordered his remains to be interred in a solemn manner. [Jesuits.]

In 1777, Pius VI. had a serious dispute with Leopold I., grand-duke of Tuscany, and Ricci, bishop of Pistoja, on the subject of some grave moral offences which had been discovered in several convents. [Leopold II. of Germany, and I. of Tuscany.] The question of jurisdiction was at last settled, but it left a coldness between the courts of Rome and Tuscany. A more important disagreement took place between the pope and Joseph II., Leopold's brother, and emperor of Germany. Joseph was busy in suppressing superfluous convents, and emancipating the clergy of his dominions from the supremacy of Rome in matters of discipline. The principal points upon which the emperor insisted were the following:—that the monks should be subject to the jurisdiction of the bishops of their respective dioceses; that the bulls 'Vineam Domini' and 'Unigenitus,' and all other proceedings against the Jansenists, should no longer be quoted as authority; that in the universities and colleges of the Austrian states the Roman doctrines of the infallibility of the pope, of his temporal supremacy over secular princes, and his superiority over general councils, should no longer be taught. Pius VI. perceived in these reforms of Joseph II. a design to weaken the power and influence of the see of Rome, and he determined to make an effort to turn the emperor from his purpose. Accordingly he set out for Vienna in 1782, to visit the emperor, and to converse with him personally on the matters in question. For several centuries no pope had left Italy, and this movement of Pius VI. attracted universal attention. Monti wrote a poem on the subject, entitled 'Il Pellegrino Apostolico.'

Pius was received at Vienna with every honour; but he made little impression on the emperor, who referred the matter in discussion to his ministers, who were not favourably disposed towards Rome. The pope returned to his capital in disappointment, and was censured by many for having lowered the dignity of the holy see without obtaining any good result. Next came the synod of Pistoja, which was assembled by the bishop Ricci in 1786, and passed several propositions that were considered highly censurable at Rome, such as that every bishop holds his authority from Christ direct, and independent of the pope; that he should every two years convoke a synod of the parish incumbents of his diocese; and that a national council should be assembled whenever any serious controversy or doubt occurs in a country concerning either a matter of faith or discipline. Ricci went still further, for he openly spoke against indulgences: he maintained that the liturgy should be in the popular language of each country; and he approved of the four articles of the Gallican church established by the clergy of France in 1682. Pius condemned these propositions by a bull, and suspended bishop Ricci from his functions; but Ricci, being supported by his sovereign, continued in his see. Ricci was in reality a Jansenist, but he was not a heretic: he proposed to restore the antient discipline of the church. He was a zealous Catholic in matters of dogma, and he was even remarkably strict in enforcing the fasts and abstinence from meat on certain days prescribed by the church.

Pius VI. was also busily employed in other matters besides controversy. He undertook and partly effected, through the direction of the engineer Rapini, the draining of the marshy region, containing near two hundred square miles, called the Pomptine marshes, by which a considerable proportion of it was made cultivable. He restored the antient Via Appia, which had become impassable, and built villages and post stations along the same. He also restored the port of Terracina, and adorned it with handsome buildings. He greatly enlarged the museum of the Vatican, which he made one of the richest in Europe in works of sculpture, vases, precious marbles, and other remains of antiquity; and he caused a splendid set of engravings of the objects in this museum to be published, under the title of 'Museo Pio Clementino.' He made additions to the church of St. Peter's, and embellished Rome with new palaces, fountains, and other structures.

The internal administration of Pius was liberal and mild. An unusual freedom of opinion and speech prevailed at Rome, a number of learned men gathered thither from other parts of Italy, many foreigners came to settle in that capital, the fine arts were encouraged by the pope and by several of the cardinals, and modern Rome had perhaps never been, since the times of Leo X., so brilliant and so pleasant a residence as it was under the pontificate of Braschi. But the storms of the French revolution darkened the scene, and rendered the latter years of Pius as gloomy and calamitous as the earlier part had been bright and prosperous. In the first period of that revolution, Pius VI. solemnly condemned the abrupt changes made in France concerning the discipline and the property of the clergy; but with regard to general or secular politics he showed great temperance. He even encouraged a man of learning, Spedalieri by name, to publish, in 1791, a work entitled 'I Diritti dell' Uomo' (the Rights of Man), in which the author openly condemns despotism, and asserts that a nation has the right of deposing a sovereign who abuses his authority, and he confirmed his doctrines by the authority of Thomas Aquinas, in his work 'De Regimine Principum,' addressed to the king of Cyprus. But, unlike Paine and the other expounders of the rights of man in France, Spedalieri maintains that the Christian religion is the surest, nay, the only guarantee of the rights of man and of civil freedom, and that social institutions, though they are the work of man, ought to be conformable to the Divine laws as revealed to us in the Scriptures. The work of Spedalieri was dedicated to Cardinal Ruffo, treasurer of the apostolic chamber, and Pius VI. rewarded the author with a stall in the chapter of St. Peter's.

An accident which occurred at Rome in January, 1793, widened the breach already existing between France and Rome. A young man, Hugo Basseville, an agent of the French republican party, being on his way to Naples, where he had been appointed secretary of embassy, made a foolish demonstration in the Corso, or high street of Rome, apparently to sound the opinions of the people. He appeared in a carriage with several tricoloured flags, and distributed revolutionary tracts, vociferating something about liberty and against tyrants; but he soon found that the people of Rome were not prepared to listen to him. A mob was collected; he rushed out or was dragged out of his carriage, and mortally stabbed in several places by the populace. The military came to the spot, but too late; some of the murderers were taken and tried; and yet the papal government, though innocent of the fact, was charged by the French Convention as being a party to it. [Monti.] The pope then joined the league of the sovereigns against France, and strengthened his military establishment.

When General Bonaparte invaded Northern Italy in 1796, he took possession of the legations, but at the same time offered to the pope conditions of peace. After some negotiation, the pope refused to submit to the onerous conditions imposed on him by the Directory. Bonaparte, who was then threatened by fresh armies from Austria, openly blamed the Directory for their harshness towards the court of Rome, saying that was not the way to make friends in Italy, and he spoke very highly of several cardinals and prelates with whom he was in friendly intercourse. (*Correspondence of General Bonaparte*, Letters of the 8th October, 1796, and 1st of January, 1797.) Meantime however he took possession of Ancona and Loreto, after defeating the papal troops on the banks of the river Senio; but the pope having sent envoys to sue for peace, Bonaparte granted it to him at Tolentino upon more moderate conditions than might have been expected. After the peace of Campoformio (October, 1797) and Bonaparte's departure from Italy, the agents of the Directory added vexation to vexation against the unfortunate pope, who, old and infirm, was unequal to the difficulties which crowded upon him. The papal treasury being drained, in order to pay the contribution of thirty millions of livres (1,200,000*l.*), the pope was obliged to seize the deposits in the Monte di Pietà, by which many families lost all they had. A tragical incident hastened the catastrophe. On the 28th December, 1797, a small band of revolutionists of Rome and other parts of Italy, with some Frenchmen among them, among whom was General Duphot, who was attached to the French embassy at Rome, having dined together in the palace of the French academy of the arts, and being heated with wine, took into their heads to renew the former attempt of Basseville. Raising the tricoloured flag, they sallied into the streets, calling out that they were going to hoist the ensign of liberty on the Capitol. A body of military came to disperse them, which was effected at first without bloodshed; but the fugitives ran to the palace of the French ambassador, followed by the soldiers, who fired and wounded some of the insurgents. The remainder rushed into the vestibule and court of the palace. The papal soldiers halted outside, but being provoked and mocked by those within, they rushed into the court, in order to clear it of the insurgents. The ambassador then made his appearance on the great staircase, in company with General Duphot, to appease the tumult. The soldiers cried out that the rebels should immediately quit the palace; but Duphot, who was young and hasty, drew his sword and encouraged the insurgents to drive the papal soldiers out of the court. The soldiers then fired, and Duphot, with several of the insurgents, fell. This affray was by the French Directory made the pretext for invading Rome and dethroning the pontiff, a thing on which they were bent, and would have effected long before, had it not been for Bonaparte's cooler policy. After issuing manifestoes in the usual style of those times, calling in plain terms the court of Rome a nest of assassins, the Directory ordered Berthier to march upon Rome. The pope gave orders that no opposition whatever should be made, as it would only serve to aggravate the evil. On the 10th February, 1798, Berthier entered Rome with his army, took possession of the castle St. Angelo, and went himself to live in the Quirinal palace. Pius VI., forsaken by most of the cardinals, who had escaped, remained in the Vatican. On the 15th of the same month a crowd of men assembled on the Campo Vaccino, dragging with them a tree which they styled the tree of liberty, and fixed it in the ground with a red cap on the top of it. Some of the leaders then began to ask the multitude what they wanted, and the answer was, that they wished to live free in a republican form, without any pope. The leaders gravely asked 'whether that was the will of the Roman people;' which was answered by acclamations in the affirmative. Five notaries then drew up a solemn act to that purpose, which was taken to Berthier. The French general ascended the Capitol, followed by a large retinue of officers, and proclaimed the Roman republic 'the sister and ally of France,' and said something in praise of 'the descendants of the Brutuses and the Scipios.' Songs, illuminations, and balls concluded the ceremony. Berthier afterwards sent an officer to intimate to the pope that he must renounce his temporal sovereignty. Pius answered, that he had received it from God and by the free election of men, and could not renounce it; that he was eighty years old, and his troubles could not be of long duration, but that he was determined to do nothing derogatory to his high office. Next came the commissary-general of the French army, who, after taking an inventory of all the valuables that still remained in the papal residence, ordered Pius to prepare to set out in two days. The pope said he could not oppose force, but protested against this new act of violence. On the 20th of February, Pius VI. left the Vatican with a few attendants, and, escorted by a strong detachment of cavalry, took the road to Florence. He was lodged first in a convent at Siena, and afterwards in the Carthusian convent near Florence, where he remained till the following year, when the French, having driven out of Tuscany the grand-duke Ferdinand, and being threatened by the Austro-Russians, who were advancing to the Adige, ordered the pope to be transferred to France. They took him to Pignerol, and from thence, in the month of April, the old pontiff was made to cross the Alps in a litter by the pass of Mount Genèvre, which was covered with deep snow, to Briançon. From thence he was taken to Grenoble, and afterwards to Valence on the Rhône, where he died, in August of that year (1799), in the 82nd year of his age and the 24th of his pontificate. Just before his death the Roman republic had ceased to exist, the French being driven out of Italy by the Austro-Russians, and Rome was occupied by Austrian and Neapolitan troops. The short period of the so-called republican government, enforced by French bayonets, was one of unspeakable distress for the people of Rome: dearth, exactions, suspension of commerce, and consequent poverty, overbearing military rule, authorised licentiousness, and general confusion of society, were the characteristics of that time.

In the year 1802, after the restoration of the papal government, the remains of Pius VI. were transferred to Rome by leave of the first consul Bonaparte, at the request of his successor Pius VII., and deposited with solemn pomp in the church of St. Peter.

(Botta, *Storia d' Italia*.)

PIUS VII. (Cardinal Gregorio Barnaba Chiaramonti) was born in the year 1742, of a noble family of Cesena, which is supposed to have been originally a branch of the French house of Clermont. He first studied in the college of Ravenna, and subsequently entered the order of Benedictines, in 1758. He was appointed lecturer on philosophy, and afterwards on theology, to the novices of his order, first at Parma and then at Rome. Pius VI. appointed him bishop of Tivoli, and in 1785 made him a cardinal and bishop of Imola. When Bonaparte took possession of the legations, and annexed them to the Cisalpine republic, Cardinal Chiaramonti in a homily exhorted his flock to submit to the new institutions, and to be faithful to the state of which they had become a part. This conduct is said to have acquired him the good opinion of Bonaparte. When the news of the death of Pius VI., in his exile at Valence, in August, 1799, came to Italy, the conclave being summoned to assemble at Venice, then under the dominion of Austria, as Rome was in a state of anarchy, Cardinal Chiaramonti repaired to the former city. Thirty-five cardinals assembled at Venice, in the Benedictine convent of S. Giorgio Maggiore, in order to elect a new pope, a dignity apparently not very enviable in those troubled times. The deliberations of the conclave lasted several months, and at last Cardinal Chiaramonti was chosen, on the 14th of March, 1800, and crowned pope on the 21st of the same month, under the name of Pius VII. In the following July the pope made his entrance into Rome, and soon after appointed Cardinal Consalvi his secretary of state, or prime minister. [Consalvi.] In the following year the peace of Luneville, between France and Austria, was made, and Bonaparte, first consul of France, ordered his troops to evacuate the Papal territories, with the exception of the legations, which had been formally incorporated with the so-called 'Italian Republic.' Meantime the ecclesiastical affairs of France were in a state of the greatest confusion. France was still nominally Roman Catholic, but the clergy were no longer in communication with the see of Rome, and were divided into parties. One party consisted of those who had sworn fidelity to the republican constitution, and were called 'Prêtres assermentés,' or 'constitutionnels;' another was composed of those who protested against the changes that had taken place in the administration of the church since the Revolution, and were called 'insermentés,' or 'réfractaires.' Each party had its bishops, who were in a state of schism towards one another. Many dioceses had no bishops, and others had two; some of the constitutional priests were latitudinarians in principle as well as in practice; others had married, contrary to the canons of the council of Trent; and others professed Jansenist principles. The refractory priests were generally soured by their past sufferings, were intolerant by principle, and provoked persecution against themselves rather than acknowledge the liberty of conscience which the government had proclaimed. In the midst of this confusion about one half of the population of France followed no mode of worship, and professed no religion whatever. A vast number of parish churches were shut up, and had been so for ten years. (Jauffret, *Mémoires sur les Affaires Ecclésiastiques de France*, vol. i.; Thibaudeau, *Mémoires sur le Consulat.*) Bonaparte wished for a concordat with Rome. The pope appointed the prelate Spina and the theologian Caselli, who proceeded to Paris, and Bonaparte named his brother Joseph, Cretet, councillor of state, and Bernier, a Vendéan priest, to treat with the pope's negotiators. At the same time Bonaparte, who was not himself much acquainted with ecclesiastical controversy, listened willingly to the advocates of the various parties. Grégoire, bishop of Blois, one of the leaders of the constitutional clergy, was opposed to the concordat. According to him, the church had no need of it: 'She had done without it for twelve centuries; the canons of the first four Œcumenical councils were sufficient for its administration. Vacancies to the sees should be filled up by election, by the bishops of the province, under the presidence of the metropolitan. The Gallican church ought to be untrammelled by Roman jurisdiction.' (Gregoire, *Essai Historique sur les Libertés de l'Eglise Gallicane.*) Others advised Bonaparte to proclaim unrestricted religious freedom and liberty of worship. (De Pradt, *Les Quatre Concordats.*) Others told him that he had in his hands the most favourable opportunity of shaking off the power and influence of the Roman see, and establishing in France a reformed religion. 'A vast number of people agreed about the necessity of having one established mode of worship, and most of the large proprietors were of this opinion, not that they were religiously inclined, but because they looked upon religion as the safest guarantee of their property. They wished to see an end of ecclesiastical anarchy, and if the first consul had thought proper to change the religion of France, he would have found not a few to support him.' (Jauffret, *Mémoires sur les Affaires Ecclésiastiques.*) But Bonaparte considered that if he were to proclaim the reformed communion, he would have one half of France against it, whilst of the other half only a small part would support him in earnest. He preferred therefore to be with the decided majority, as affording an easier means of government. Bonaparte's instructions to his negotiators were, 1, that there should be no longer any exclusive form of religion in France, and that therefore the only thing that could be done was merely to state that the Roman Catholic was the state religion, being that of the majority of the people; 2, that a new division of dioceses was requisite; 3, that with regard to the nomination and institution of the bishops, they might take the concordat of 1516 between Francis I. and Leo X. as a basis; 4, that all monastic orders requiring perpetual vows should remain suppressed. Above all he required the business to be promptly settled, and he wrote to Rome to that effect. The pope despatched to Paris Cardinal Consalvi, who smoothed down all difficulties, and the concordat was signed at Paris, the 15th of July, 1801, and was ratified by Pius at Rome, after some hesitation and consultation, on the 14th of August following. The principal scruples of the pope were concerning certain articles called 'organic,' which Bonaparte appended to the concordat, as if they had formed part of it, and which were proclaimed as laws of the state. (Botta, b. xxi.; Thibaudeau.)

From 1801 till 1804 Pius VII. enjoyed tranquillity at Rome, which he employed in restoring order to the finances, in ameliorating the judicial administration, in promoting the agriculture of the Campagna, and in other similar cares. His personal establishment was moderate, his table frugal, his habits simple, and his conduct exemplary. In May, 1804, Napoleon was proclaimed emperor, and some time after he wrote to the pope requesting him to crown him solemnly at Paris. After considerable hesitation Pius consented, and set off from Rome at the beginning of November of that year. The ceremony of the coronation took place in the cathedral of Notre Dame, after which the pope spent several months in Paris, visiting the public establishments, and receiving the homage of men of all parties, who were won by his unassuming yet dignified behaviour, and his unaffected piety. In May, 1805, he returned to Rome; and his troubles began soon after. In October, 1805, a body of French troops suddenly took military possession of Ancona. Pius remonstrated by a letter which he wrote to Napoleon, who was at that time at the head of his army in Austria. It was only after the peace of Presburg that he received an answer, in which Napoleon said, that he considered himself as the protector of the church against heretics and schismatics, like his predecessors from the time of Charlemagne, and that as such he had occupied Ancona to prevent it falling into the hands of the English or the Russians. Soon after, Napoleon officially required the pope, through his ambassador at Rome, to expel from his dominions all English, Russian, Swedish, and Sardinian subjects, and to forbid his ports to the vessels of those powers who were then at war with France. Pius replied at length in a letter to Napoleon, representing to him that his request was destructive of the independence of the Papal State and of its political neutrality, which were necessary to the welfare of the church and for the security of the numerous members of it who were living in those very countries with which the emperor was then at war. He said that the head of the church ought to be a minister of peace, and not to take part in a war which has not religion for its object; that if some of his predecessors had not always abided by this rule, he at least should not follow their example. Napoleon however insisted, and an angry correspondence was carried on between the two courts for about two years on this subject of contention, the neutrality of the Papal State being all the while merely nominal, as the French troops marching from and to Naples crossed and recrossed it at their pleasure, and the French also kept a garrison at Ancona, the only papal port of any importance. By degrees they extended their posts all along the Adriatic coast, and garrisoned the various ports. Some time after, a body of French troops, coming from Naples, passed through Rome, ostensibly to proceed to Leghorn, but they suddenly turned out of the main road and surprised in the night the town of Civitavecchia, of which they took military possession. In all these places they confiscated whatever English property they could find. The papal troops at Ancona, Civitavecchia, and other places, were ordered to place themselves under the direction of the French commanders, and some officers who refused to do so were arrested and kept in confinement. Napoleon in the mean time found fresh grounds of quarrel with the pope. He wished to declare the marriage of his brother Jerome with an American Protestant lady null; but Pius refused, saying that although the church abhorred marriages between Catholics and heretics, yet if they were contracted in Protestant countries, according to the laws of those countries, they were binding and indissoluble. ('Letter of Pius VII.' on this important subject, in Artaud, *Vie du Pape Pie VII.*, Paris, 1826.) He next accused the pope of dilatoriness in giving the canonical institution to the bishops elected to vacant sees in the kingdom of Italy. The delay was defended by the court of Rome on the ground of the non-execution or misinterpretation by the French of several articles of the concordat, especially as to the Venetian territories, which had been annexed to the Italian kingdom after the concordat was made, and which the pope did not therefore include in its provisions. Eugene Beauharnois, viceroy of the kingdom of Italy, wrote a very able and conciliatory letter to the pope, in order to bring about an arrangement, and the pope was induced to invite the bishops elect to Rome, in order to receive the canonical institution, when a threatening letter came, written by Napoleon from Dresden, after the peace of Tilsit, in the summer of 1807, in which he said that 'the pope must not take him for a Louis le Débonnaire; that his anathemas would never make his soldiers drop their muskets; that he, Napoleon, if provoked too far, could separate the greater part of Europe from the Roman church, and establish a more rational form of worship than that of which the pope was the head, that such a thing was easy in the actual state of people's minds,' &c.; and he forbade Eugene to correspond any longer with the pope, or send the bishops elect to Rome, for, he said, 'they would only imbibe there principles of sedition against their sovereign.' Matters were now brought to an open rupture. A French force under General Miollis entered Rome in February, 1808; took possession of the castle and the gates, leaving however the civil authorities undisturbed. The pope was prevailed upon to send Cardinal De Bayanne as his legate to Paris, to make a last effort at reconciliation, but the cardinal had not arrived at his destination when a decree of Napoleon, dated 2nd April, 1808, united the provinces of Ancona, Macerata, Fermo, and Urbino to the kingdom of Italy, stating in the preamble: 1, that the temporal sovereign of Rome had constantly refused to declare war against the English, and to enter into a confederation with the kings of Italy and of Naples for the defence of the peninsula; 2, that the interests of those two kingdoms required an uninterrupted communication between them; 3, that the donation made by Charlemagne to the see of Rome was intended for the advantage of the church, and not for that of heretics and enemies to that church; 4, lastly, that the ambassador of Rome at Paris had demanded his passport on the 30th March last, and the diplomatic relations between the two states were at an end.

Fresh remonstrances on the part of Pius were answered by threats of further hostile measures on the part of Napoleon, unless the pope entered into an offensive and defensive league with the kingdoms of Naples and Italy, and by a declaration that 'the pope would lose his temporal sovereignty and remain bishop of Rome as his predecessors were during the first eight centuries and under the reign of Charlemagne.' (*Note de M. de Champagny, Ministre des affaires étrangères, à S. Eminence le Cardinal Caprara*, 18th April, 1808.)

The war which began soon after in Spain prevented Napoleon from occupying himself with the affairs of Rome, which remained in a state of uncertainty amidst frequent clashing between the French military authorities and the papal civil officers. The papal treasury, impoverished as it was by the loss of its finest provinces, was obliged to pay the French troops which garrisoned the towns that still nominally belonged to the pope. All the disaffected and the turbulent, trusting to French protection, openly insulted the papal government. The pope remained confined to his palace on the Quirinal with his Swiss guard at the gates, not wishing to expose himself to violence by venturing out.

On the 17th May, 1809, Napoleon, who was then making war against Austria, issued a decree from Vienna, in which he united the remainder of the Roman states to the French empire, leaving to the pope his palaces and an income of two millions of francs (80,000*l.* sterling). The preamble of the decree was, as usual, grounded on the alleged donation of Charlemagne, 'his illustrious predecessor,' to the see of Rome, which donation, it was stated, was on the condition of feudal allegiance, Rome being still considered as belonging to the empire. 'But the union of the two powers, temporal and spiritual, having proved a source of perpetual discord, and of never-ending pretensions and assumptions, he, Napoleon, thought proper, for the security of his empire and of his people, to resume the grant of Charlemagne.'

On the 10th June, 1809, the pope issued a bull of excommunication against all the perpetrators and abettors of the invasion of Rome and of the territories of the Holy See. The bull was affixed to the gates of the principal churches of Rome and in other public places. The text of the bull is given by Cardinal Pacca, in his 'Memorie Storiche,' Appendix to the 1st part, No. v.

The French commander, Miollis, being afraid of an insurrection of the people of Rome, who had shown unequivocal signs of attachment to their sovereign, thought it expedient to remove Pius from the capital. It is stated, in the 'Memoirs of Las Cases,' that he did this without orders from Napoleon, who was still with his army in Austria, but that he concerted his measures with Murat, king of Naples, who sent him a reinforcement of Neapolitan troops for the purpose. General Radet of the gendarmerie was entrusted with the abduction of the pope, who had shut himself up in his palace on the Quirinal. Between two and three o'clock in the morning of the 6th of July, some men scaled the walls in the greatest silence, broke open several doors, and having opened the great gates, let in their comrades from without. The Swiss guards made no resistance, having orders to that effect from the pope. General Radet penetrated to the apartment in which Pius was, and found him in full dress, surrounded by several attendants. The general told him respectfully that he had orders to remove him from Rome unless he consented to sign an abdication of his temporal sovereignty, and on the pope saying that he could not do that, Radet told him that he must depart immediately. 'I then yield to force,' replied Pius; and, taking his breviary under his arm, he accompanied the general to the gate, where his carriage was ready, and drove off under an escort. He was taken first to Grenoble in Dauphiné, from whence he was removed, by order of Napoleon, to Savona in the Riviera of Genoa, where he remained till June, 1812, when he was removed to Fontainebleau, by an order from Napoleon. During his stay at Savona, Napoleon convoked a council at Paris of the bishops of his empire, but he found that assembly less docile than he expected, and he dissolved it without any conclusion being come to. The great question was how to fill up the vacant sees, when the pope refused the canonical institution. The pope at the same time would not recognise Napoleon's divorce from his first wife Josephine. In short, Napoleon found that unarmed priests were more difficult to conquer than the armies of one half of Europe. (Thibaudeau, *Le Consulat et l'Empire*, ch. 77; Botta, *Stòria d'Italia*, b. 25.) The plan of Napoleon was to have the pope settled at Avignon, or some other town of his empire, as his subject and his pensionary, and to have himself the nomination not only of the bishops, but of the cardinals also, by which means he would have added to his already overbearing temporal power the incalculable support of a spiritual authority which extends over a great part of the world. The resistance of Pius disappointed his views. 'Strange, but true,' exclaims Botta, 'in this instance the independence of the church was the only remaining prop of general liberty, and if the ecclesiastical authority had given way, no check was left against a universal and overwhelming tyranny.' Napoleon at last imagined that by removing Pius to Fontainebleau, he might succeed in overcoming his firmness. Pius was again obliged to make a long journey with the greatest secresy. He arrived at Fontainebleau in June, 1812, and was lodged in the imperial palace, and treated with marked respect. Napoleon had set out on his Russian expedition. After his return from that disastrous campaign, in December, 1812, he went to see the pope, embraced him, and treated him with studied attention; he also allowed several cardinals who were at Paris to repair to Fontainebleau, and at last, chiefly through their persuasions, he prevailed upon the pope to sign a new concordat, the 25th of January, 1813. It is not true, as some have stated, that Napoleon, in one of his conferences with Pius, had lifted his hand against him and struck him. Pacca ('Memorie Storiche,' part iii., ch. 1) denies this on the authority of Pius himself, but thinks it very probable that Napoleon spoke to his prisoner in an authoritative and threatening tone.

The principal articles of the concordat were, 1, that the pope should give to the bishops who might from time to time be elected to the vacant sees, in six months at latest after their nomination by the emperor, the canonical institution. If this were not granted after six months, the metropolitan of the province (and on his default, the senior bishop) should give the institution to the bishops elect, so that no see should remain vacant longer than a twelvemonth; 2, the pope should have the nomination to ten sees of France and Italy, besides that of the six bishops, called suburbicarii, in the neighbourhood of Rome; 3, the other bishops of the Papal State, who had been banished their dioceses for noncompliance with the orders of Napoleon, should not be reinstated, but appointed bishops 'in partibus;' 4, the pope was to fix his residence either in France or in the kingdom of Italy, and to hold his court and appoint his officers, ministers, and legates as before, in his quality of head of the church; 5, the emperor Napoleon granted full amnesty to the cardinals and other prelates or clergymen who had incurred his displeasure during the late controversy. (Pacca, *Memorie Storiche*, part ii., ch. 6.)

Napoleon hastened to publish the articles of the concordat, and to give them the force of laws of the empire; after which he granted free access to the pope to all cardinals and others who chose to repair to Fontainebleau. Pius, who had scruples concerning some of the articles which he had signed, laid them before the cardinals, and asked their opinion. Several of the cardinals, especially the Italian ones, such as Consalvi, Pacca, Litta, and Di Pietro, stated that some of the articles were contrary to the canon law and the legitimate jurisdiction of the Roman see, and pregnant with the most serious evils to the church, and they urged the necessity of a prompt retractation. They quoted the well-known example of Paschal II., who, in similar circumstances having ceded to the emperor Henry V. the right of investiture, hastened to submit his conduct to the judgment of a council assembled in the Lateran, and the council revoked the cession. [PASCHAL II.] Upon this Pius wrote to Napoleon, on the 24th of March, retracting his concessions, but proposing a new basis for a concordat; Napoleon however took no notice of the retractation, except by exiling some of the cardinals who, he thought, had influenced it. Napoleon soon after set off for his army in Germany, and the affair with the pope remained in suspense. It was only after the defeat of the French armies and their expulsion from Germany that Napoleon proposed to restore to the pope the Papal States south of the Apennines, if the pope would agree to a concordat. Pius answered, that he would not enter into any negotiations until he was restored to Rome. On the 22nd of January, 1814, an order came for the pope to leave Fontainebleau the following day. None of the cardinals were allowed to accompany him. He set off accompanied by an escort, and was taken to Italy. On arriving at the bridge on the river Nura, in the state of Parma, he met the advanced posts of the Neapolitan troops under Murat, who was then making common cause with the allied powers against Napoleon. Murat had taken military occupation of the Roman state, but he offered to give up Rome and the Campagna. Pius however preferred stopping at Cesena, his native town, until the political horizon was cleared up. After the abdication of Napoleon and the peace of Paris, Pius made his entrance into Rome, on the 24th of May, 1814, in the midst of rejoicings and acclamations. His faithful Consalvi soon after resumed his office of secretary of state. By the articles of the congress of Vienna the whole of the Papal States were restored, including the legations, which were not however evacuated by the Austrian troops until after the fall of Murat, in 1815.

The remaining years of the life of Pius were spent in comparative tranquillity, though not in idleness. He applied himself to adapt, as far as it was practicable, the civil institutions of his dominions to the great changes which had taken place in the social state. By a 'motu proprio' of the year 1816, he confirmed the suppression of all feudal imposts, privileges, monopolies, and jurisdictions; he abolished every kind of torture, including that called the 'corda,' or 'estrapade,' which was formerly a frequent mode of punishment at Rome; he diminished the land-tax; retained the register of hypothèques, or 'mortgages,' instituted by the French; laid down the basis of a new code of public administration, and in November of the following year he published a new code of civil procedure, in which he regulated the costs of judicial proceedings. He maintained the commercial courts established by the French, as well as the new system of police, enforced by a regular corps of carabineers, instead of the old 'sbirri,' who were ineffective and corrupt. (Tournon, *Etudes Statistiques sur Rome*, b. iv., ch. 6.) Unfortunately however the old system of secret proceedings in criminal matters was restored, as well as that of the ecclesiastical courts, which have jurisdiction also over laymen. Pius however made some important alterations in the form of proceeding of the Inquisition, abolishing torture as well as the punishment of death for offences concerning religion. He did probably all that he could do as a pope, and certainly more than any pope had done before him. Cardinal Consalvi took vigorous measures to extirpate the banditti of the Campagna; and in July, 1819, he ordered the town of Sonnino, a notorious nest of incorrigible robbers, to be razed to the ground. With regard to spiritual matters, Pius concluded a new concordat with France, Naples, Bavaria, and other states. He condemned by a bull the political society of Carbonari, as well as other secret societies.

In the month of July, 1823, Pius, who was then eighty-one years of age, had a fall in his apartments, and broke his thigh. This accident brought on inflammation, and after a few weeks he died, on the 20th of August, universally regretted. He was succeeded by Leo XII. Thorwaldsen was commissioned to make his monument, which has been placed in St. Peter's.

Pius VII. stands prominent among the long series of popes for his exemplary conduct under adversity, his truly Christian virtues, and his general benevolence and charity. Free from nepotism, modest, unassuming, and personally disinterested, he was a staunch though temperate defender of the rights of his see, and his meek bearing and unblemished character engaged on his side the sympathies of the whole Christian world, without distinction of community or sect, during his long struggle with his gigantic and ungenerous adversary.

PIUS VIII. (Cardinal Castiglioni) was elected in March, 1829, to succeed Leo XII., and died at the end of the following year. He was succeeded by Gregory XVI. Nothing remarkable occurred during his short pontificate. Pius VIII. died just before the explosion of the abortive attempt at insurrection in the Romagna, in consequence of the events of Paris, of July, 1830.

PIX, TRIAL OF THE. The private assay within the Mint, which sanctioned the delivery of the coins to the owner of the bullion, was not considered by our ancestors as a sufficient security for the integrity of the coins, but they required them to be submitted to a trial by a jury before the master could receive his discharge; and this trial was repeated at such short intervals as to form a sufficient check upon improper issues of the money. This final examination is technically called the Trial of the Pix, from the box in which the coins, which have been selected for that purpose, are contained. They are secured by three locks, the keys of which are respectively in the custody of the warden, master, and comptroller of the Mint.

The first regular public trial of the Pix upon record, according to Madox (*Hist. Excheq.*, vol. i., p. 291), took place in the ninth and tenth year of Edward I., when the king commanded, by writ, the barons of the exchequer to take with them Gregory de Rokesle, and straightway, before they retired from the exchequer, to open the boxes of the assay of London and Canterbury, and to make the assay in such manner as the king's council was wont to do, and to take an account thereof, so that they might be able to certify the king touching the same, whenever he should please.

From the form of this trial laid down in an indenture of the 18th Edward III., it was then to be made regularly every three months. In subsequent reigns however, down to a late period, this trial was made at uncertain times. In the reign of George II. it was called for when two or three millions had been coined. The practice of more modern times has been to call for a trial of the pix usually upon the appointment of a new master of the Mint, in order that the master who has retired may receive his discharge.

As the authority under which these trials were held occasionally varied, so did likewise the persons who sat as judges in the court. They were first the members of the king's council, then the barons of the exchequer, and again the members of the privy council as judges of the Star Chamber, where sometimes the king himself presided, as did James I. at an assay which was made upon the 9th of May, 1611. During the period of the interregnum, in which at least six trials of the pix were held, the authority and judges were in almost every instance varied. The court is now composed of such members of the privy council as are expressly summoned for that purpose, the lord-high-chancellor, or, in his absence, the chancellor of the exchequer, presiding.

Ruding was unable to discover any very antient ceremonial by which the forms of this trial were regulated. He found one however among the Harleian manuscripts in the British Museum (No. 698, fol. 169) which professed to be the order of older times. It was evidently derived from an earlier date, as in the form of the oath the standard is called the king's, and not the queen's, and was drawn up by Sir Richard Martyn, warden of the Mint, who held that office from the second to the thirty-seventh of Elizabeth. Ruding, in the appendix to his 'Annals of the Coinage of Britain,' has given an abstract of the pix verdicts from 1603 to 1802.

'The modern practice,' says Ruding, 'is for the master of the Mint to present a memorial praying for a trial of the pix. Upon this the chancellor of the exchequer moves his Majesty in council, who commands the trial to be holden; and the members of the privy council are accordingly summoned to meet at a certain day and hour (eleven o'clock in the forenoon) at the house lately inhabited by the usher within the receipt of his Majesty's exchequer at Westminster.* A precept is likewise directed by the lord-high-chancellor to the wardens of the Goldsmiths' Company, requiring them to nominate and set down the names of a competent number of sufficient and able freemen of their Company, skilful to judge of and to present the defaults of the coins, if any should be found, to be of the jury, to attend at the same time and place. This number is usually twenty-five, of which the assay-master of the Company is always one.

'When the court is formed, the clerk of the Goldsmiths' Company returns the precept, together with the list of names; the jury is called over, and twelve persons are sworn.

'The president then gives his charge, which used formerly to be general, like the oath, to examine by fire, by water, by touch, or by weight, or by all or by some of them, in the most just manner, whether the monies were made according to the indenture and standard trial-pieces, and within the remedies; but in 1734 the lord-high-chancellor Talbot directed the jury to express precisely how much the money was within the remedies, and the practice which he thus enjoined is still continued. The other parts of the charge necessarily vary according to the ability of the president and his knowledge of the subject.

'When it is concluded, the pix is delivered to the jury, and the court is commonly adjourned to the house of the president, where the verdict is afterwards delivered in writing.

'The jury then retires to the court-room of the duchy of Lancaster, whither the pix is removed, together with the weights of the Exchequer and Mint, and where the scales which are used upon this occasion are suspended, the beam of which is so delicate that it will turn with six grains, when loaded with the whole of those weights, to the amount of 48lbs. 8ozs. in each scale.

'The jury being seated, the indenture, or the warrant under which the master has acted, is read. Then the pix is opened, and the money which had been taken out of each delivery and enclosed in a separate paper parcel, under the seals of the warden, master, and comptroller of the Mint, is given into the hands of the foreman, who reads aloud the indorsement, and compares it with the account which lies before him. He then delivers the parcel to one of the jury, who opens it, and examines whether its contents agree with the indorsement.

'From the minutes which I took at a trial of the pix in the year 1799, it appears that it then contained—

Guineas	7590
Half guineas	1085
Thirds of guineas, or pieces of seven shillings	1073,

making by tale 8914*l.* 13*s.* 6*d.*, being the pieces taken from ninety-three deliveries, from the 3rd of December, 1794, to the 27th of March, 1799, which deliveries amounted in weight to 146,220lbs.

'The silver coins in the pix were only one groat, one quarter-shilling, one half-groat, and one penny, making by tale ten pence. They were taken from one delivery of 94lbs. 8ozs. 10dwts., on the 16th of December, 1795.

'When all the parcels of gold were opened and found to be right, then the monies contained in them were mixed together in wooden bowls, and afterwards weighed in five parts.

	lbs.	ozs.	dwts.	grs.
'The first weighed . .	42	8	0	12
The second	42	8	0	12
The third	42	8	0	12
The fourth . . .	42	8	0	12
The fifth	20	1	6	0
	190	9	8	0

'By calculation at the rate of 46*l.* 14*s.* 6*d.* to the pound troy, which is the proportion required by the indenture, they ought to have weighed 190lbs. 9ozs. 9dwts. 15grs.; so that they were deficient one pennyweight fifteen grains. But the remedy on 190lbs. 9ozs. 9dwts. 15grs. is 1lb. 3ozs. 18dwts. 0gr.; they were therefore within the remedy by 1lb. 3ozs. 16dwts. 9grs.

'The jury then took from the said monies so mingled together thirty-four guineas, thirteen half-guineas, and twelve seven-shilling pieces, for the assay by fire. The above coins were all the different sorts contained in the pix. By tale they amounted to 46*l.* 14*s.* 6*d.*, and they were in weight exactly one pound, which is the quantity taken for that purpose, particular attention being paid that some of every sort of coin shall be selected.

'The indented standard trial pieces of gold and silver, of the dates specified in the indenture, were then produced by the proper officers, and a sufficient quantity cut off from each, and compared with the pound weight of gold coin, and the aforesaid several pieces of silver coin, by the usual methods of assay.

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* This house was subsequently allotted to the office of deputy clerk of the pells in the Exchequer. It was inhabited by the usher in 1799, when Mr. Ruding took his Minutes. It has since been destroyed, with the other buildings of the Exchequer, to make way for the new Houses of Lords and Commons.

'When that operation was finished, the jury returned their verdict, that the gold coins were in weight and in alloy sufficient according to the terms of the indenture; as were also the silver coins in alloy; but the quantity of them was too small to allow their agreement in weight to be ascertained.'

The trial in 1799 was an assay of the coins minted during a period of somewhat more than four years. The 'Gentleman's Magazine' for 1815 (vol. lxxxv., pt. ii., p. 207) contains an account of the trial of the pix upon the monies coined from the 19th February, 1806, to the 28th September, 1814, of gold to the amount of 47,613lbs. weight, and of 209lbs. of silver, which had been coined into 2,224,717*l.* 8*s.* 6*d.* of gold, and 647*l.* 18*s.* of silver; the gold consisting of half-guineas and seven-shilling pieces, and the silver of fourpences, threepences, twopences, and pence. The total contained in the pix was—

	£.	s.	d.
Gold . .	1719	18	0
Silver . .	0	12	0
	1720	10	0

(Ruding's *Annals of the Coinage of Britain*, new edit., 1840, vol. i., p. 69-76.)

PIZARRO, FRANCISCO, the discoverer and conqueror of Peru, was the natural son of Gonzalo Pizarro, an officer who served with considerable distinction under the Great Captain in the Italian wars. Gomara relates that Francisco was born upon the steps of a church, and in his earliest days was suckled by a sow. Garcilaso denies this, but all agree that he was born at Truxillo, about the year 1480. His education was so completely neglected, that he never learned to read or write, and he was employed by his father in tending pigs; but getting tired of this occupation, he ran away to Seville with some of his companions, became a soldier, and shortly afterwards embarked to try his fortune in the New World. The first occasion on which he gained distinction was during the expedition of Ojeda to Tierra Firma, in 1510, by whom he was left as his lieutenant in the new conquest. He gained the confidence of Vasco Nuñez de Balboa, whom he accompanied in his expedition to Mexico. On these occasions Pizarro showed himself superior to all his companions in courage, enterprise, and powers of endurance, and he became the favourite leader of the soldiers, who never felt so much confidence as when they were under his orders. Pizarro had seen fourteen years of arduous service, and was still one of the least wealthy of the Spanish colonists, when he joined Hernando de Luque and Diego de Almagro in the project of extending the Spanish conquests along the southern coast. Pizarro and Almagro could only give their personal labour and experience, while the wealthy priest, their associate, advanced 20,000 ounces of gold towards defraying the expenses of the expedition. Pizarro sailed from Panama in November, 1524, with one small ship, eighty men, and four horses, to attempt the conquest of a great country; leaving Almagro to follow with reinforcements as soon as he could raise them. Pizarro shaped his course to the south-east, but having in ignorance selected that period of the year in which the winds and currents were opposed to him, his progress was very slow. He touched at several places in Tierra Firma, where he found a most uninviting country, the low grounds of which were covered with swamps, the higher with impenetrable forests, having few inhabitants, and those fierce and hostile. Fatigue, famine, and disease having wasted his little band, Pizarro was compelled to await the arrival of Almagro at Chicama, who at length joined him, having undergone equal hardships. With unbroken spirit they decided on their course of action. Pizarro remained at Chicama while Almagro returned for fresh forces, which Luque with difficulty persuaded Pedrarias, the governor of Panama, to furnish. With these reinforcements, in the year 1526, Pizarro advanced from Chicama to the south, and explored the coast of Quito. He entered the bay of Saint Matthew, where he found a fertile country, the inhabitants of which were clothed in garments of woollen and cotton, with ornaments of gold and silver. This country being too populous to attack, Almagro returned to Panama for further aid, and Pizarro retired to a neighbouring island. The new governor of Panama, Pedro de los Rios, not only would not permit any new levies to be made, but sent a vessel to bring away Pizarro and his band. Pizarro refused to obey this order, and drawing a line on the sand with his sword, desired those who chose to remain with him to cross to his side: thirteen alone of his hardy veterans had sufficient courage to do so, with whom, and the crew of a vessel subsequently sent to his aid from Panama, he prosecuted his examination of the coast of Peru. He landed at Tumbez, where there was a palace of the Incas, and he ranged for some time peaceably along the coast. The abundance of gold and silver used by the inhabitants not only for ornament, but for utensils of common use, filled Pizarro and his companions with wonder. He returned to Panama in 1528, having encountered, during his absence of three years, greater hardships and dangers than any other adventurer of the age. The governor was not moved by his accounts of the opulence of the newly-discovered country, and it was settled by the associates that Pizarro should proceed to Europe to obtain the sanction of the emperor. By his address he succeeded in gaining the attention of Charles V. and his ministers, and without bestowing a thought upon his associates, he obtained for himself the appointments of governor and captain-general, and adelantado over all the country to be discovered, with supreme authority, both civil and military, stipulating in return to equip a certain force, and remit one-fifth of all the treasure that he should acquire to the crown. Pizarro was so poor, that without the assistance of Cortez he could not have performed his part of the agreement, and at length he sailed from Spain with only half the number of men required, among whom were his three brothers. He returned to Panama in 1530, and having with difficulty effected a reconciliation with Almagro, who was indignant at his perfidy, he sailed in February, 1531, with 186 soldiers, of whom 36 were horsemen, leaving Almagro as before to follow with reinforcements. Pizarro first surprised the principal town of the province of Coaque, where he obtained a great booty, which enabled him to despatch two of his ships to Panama and Nicaragua with remittances, which soon procured him recruits. Proceeding southward he attacked, and, after a fierce resistance, took the island of Puno, in the bay of Guayaquil. At Tumbez he was forced to remain three months, in consequence of a violent distemper among his men. At the mouth of the river Piura he founded the first Spanish settlement, and called it S. Michael. Fortunately for Pizarro a civil war was at this period raging in Peru between the brothers Atahualpa and Huascar [Peru], and each party requested his assistance against the other: Pizarro seized the opportunity, and marched up the country to Caxamarca. Having posted his little band in a strong position, he visited Atahualpa, who was encamped near that city, where the sight of a profusion of the precious metals that he found inflamed his cupidity to such a degree, that he resolved upon a plan as daring as it was treacherous and dishonourable. At a given signal, when Atahualpa was returning Pizarro's visit, the Spaniards opened a fire upon the followers of the Inca, the suddenness and surprise of which completely stupified them, and as no resistance was attempted, Pizarro carried off the unfortunate Atahualpa a prisoner to his quarters, where he was confined in a room 22 feet long by 16 feet broad. Having soon discovered the insatiable avarice of the Spaniards, Atahualpa offered as his ransom to fill this room with gold as high as he could reach. The offer was eagerly accepted by Pizarro, without the smallest intention of performing his part of the agreement. Before the whole was collected, the soldiers became so much excited at the sight of such vast treasure, that it was found impossible to restrain their impatience, and after setting aside the fifth part for the crown, and a share for Almagro's party, 1,528,500 pesos, or ounces, were divided. Pizarro's share was 2350 marks of silver, and 57,220 ounces of gold. Having obtained all that he could from Atahualpa, his feelings were soon excited to hatred and a desire of revenge, on perceiving that he was an object of scorn and contempt to Atahualpa, who had discovered that Pizarro was ignorant of the arts that he most admired in the Spaniards, reading and writing. Pizarro accordingly caused him to be put to death in 1533. The government of Peru was now so far overthrown, and the country so torn by intestine convulsions, that no effectual opposition was offered to Pizarro, who marched upon and captured Cuzco, the plunder of which city exceeded in value the ransom of Atahualpa.

In 1534, Ferdinand Pizarro landed in Spain with the royal share of Atahualpa's ransom, when Francisco's authority was confirmed with new powers and privileges, and Almagro was appointed adelantado of a country to be conquered to the southward of Pizarro's government. The reconciliation between Almagro and Pizarro had never been sincere; their evil passions were however for the present suppressed, and Almagro marched to the conquest of Chile, while Pizarro busied himself with the internal government of Peru, in the arrangement and administration of which he showed considerable judgment. In January, 1535, he founded the city of Lima, to which he gave the name of Ciudad de los Reyes. In 1536 the Peruvians rose and endeavoured to throw off the Spanish yoke: they cut off several detachments, and completely blockaded Pizarro in Lima, and his brother in Cuzco. This brought Almagro from Chile, who, having defeated the Peruvians, attacked Cuzco, took prisoners Pizarro's brothers, and subsequently Alvarado also; but certain compunctions preventing him from attacking Pizarro immediately after, the viceroy was enabled to collect his forces and attack Almagro, whom he took prisoner, and soon afterwards tried and executed in 1538. Pizarro's partiality in entirely leaving out the followers of Almagro in the subsequent allotment of lands, completely alienated them, and they attached themselves to the young Almagro, who soon became the rallying point for all who were disaffected towards Pizarro. A conspiracy was formed against him, and on Sunday, June 26, 1541, the conspirators, sixteen in number, headed by Herrada, entered the governor's palace at mid-day, the hour of repose in hot climates, and succeeded in reaching the staircase before an alarm was given. Pizarro, with his half-brother Alcantara, and a knot of faithful friends, defended themselves to the last. They fell, one after another, till Pizarro remained alone. At length, exhausted by the long conflict, and unable to parry the numerous blows aimed at him, he received a thrust in the throat, and expired in the 62nd year of his age, full of strength and vigour.

Robertson says of Pizarro, 'With a temper of mind no less daring than the constitution of his body was robust, he was foremost in every danger, patient under the greatest hardships, and unsubdued by any fatigue. Though so illiterate that he could not even read, he was soon found to be formed for command. Every operation committed to his conduct proved successful, as, by a happy but rare conjunction, he united perseverance with ardour, and was as cautious in executing as he was bold in forming his plans. To the soldierly qualities of intrepid valour, indefatigable activity, insurmountable constancy in enduring the hardships of military service in the New World, he added the address, the craft, the dissimulation of the politician, with the art of concealing his own purposes, and sagacity to penetrate into those of other men.'

(*Vidas de Españoles Célebres*, par Don M. F. Quintana; Robertson's *Hist. of America.*)

PIZZIGHETTO'NE. [Cremona.]

PIZZO. [Calabria.]

PLACE, LA. [Laplace.]

PLACENTA (Conchology), Schumacher's name for the *Placuna* of authors.

PLACENTA, in Botany, is that part of a seed-vessel on which the ovules or seeds are placed. It is always of a soft cellular texture, and is commonly found occupying the margin of a carpel. It is however as often confined to a single point, as in nettles, and many other plants. Morphologists usually regard it as a mere cellular expansion of the margin or surface of a carpel; but there seems to be no means of reconciling with this view some kinds of parietal placentæ and all kinds of the free central. This had led to the opinion that some placentæ are merely an expansion of the axis of growth, round and over which the carpellary leaves are folded; and there can be no doubt that this is true of Primulaceæ, Lamiaceæ, Boraginaceæ, and Graminaceæ at least. The subject has however as yet been very imperfectly investigated, and will probably be found connected with systematical points of great value. (Lindley's *Introduction to Botany*, 3rd ed., p. 208.)

PLACENTA. [Fœtus.]

PLACENTIA. [Piacenza.]

PLACE'NTULA, Schumacher's name for a genus of microscopic *Foraminifera*.

PLA'CITUS PAPYRIENSIS, SEXTUS, sometimes called by mistake Sextus Platonicus, or Sextus Empiricus, the author of a work entitled 'De Medicamentis ex Animalibus.' His age is unknown, but he is supposed to have lived about the fourth century A.D.; by some persons he is called Papiensis; but all that is known of him is that he was a physician, as appears from various parts of his work (cap. 27, &c.). It is written in Latin, and consists of thirty-four short chapters, each of which treats of some animal that was considered to have certain medical properties in different parts of its body. It is of little or no value, as may easily be seen from the following specimens:—against a quartan fever he directs the heart of a hare to be hung round the arm or neck (cap. 2); in order to be delivered for ever from pain in the bowels, he recommends a very young puppy to be dressed and eaten (cap. 11); for persons affected with phthisis or a bad cough, he orders the saliva of a horse to be taken, mixed with wine or water: 'This,' says he, 'I have myself tried, but it is a matter of notoriety (*expertissimum est*) that the horse will die' (cap. 14).

The work has been frequently published both separately and in different collections. It was first published in 1538, Norimb., 4to.; in the same year, Basil., 8vo. It is inserted in the first volume of the 'Medicæ Artis Principes,' published by H. Stephens, Paris, 1567, in the collection edited by And. Rivinus, Lips., 1654, 8vo.; in the thirteenth volume of the old edition of Fabricius, 'Biblioth. Græca;' and in Ackermann's collection entitled 'Parabilium Medicamentorum Scriptores Antiqui,' Norimb. et Altorf., 1788, 8vo. There are two German translations, one by Henisch, Basel, 1582, 8vo.; and the other by May or Mayer, Magdeb., 1612, fol. It should be mentioned that Constantinus Afer, in his work entitled 'De Remediis ex Animalibus,' has borrowed very freely from this treatise, and indeed copied great part of it almost word for word.

PLACOBRANCHIA'TA, or PLACOBRA'NCHIDÆ, M. Rang's name for a family of mollusks, forming his fifth family of *Gasteropoda* (Cuv.), but placed by Cuvier among his *Nudibranchiata*. [Nudibranchiata, vol. xvi., p. 362.]

M. Rang (*Manuel*) observes that M. de Férussac had shown to him some mollusks which had been sent to M. de Férussac from the Mediterranean, and in which M. Rang at once recognised the genus *Actæon* of Oken, or *Elysia* of Risso. M. de Férussac pointed out to M. Rang that the *branchiæ* covered the back and upper surface of the lobes, under the form of a vascular net, and therefore M. Rang is of opinion that it should be added to his family of *Placobranchidæ*, which had previously contained but one genus, viz. *Placobranchus*.

PLACOBRANCHUS. [Nudibranchiata, vol. xvi., p. 362; Placobranchiata.]

PLACU'NA. [Oysters; Pectinidæ, vol. xvii., p. 363.]

PLACUNANO'MIA. [Pectinidæ, vol. xvii., p. 364.]

PLAGAL, a term in old ecclesiastical music, relating solely to the Canto-Fermo, or Plain-Song, or Plain-Chant, and signifying *collateral*. The Plain-Song was seldom allowed to exceed the compass of an octave, and never went beyond nine notes. When the octave was so divided that the fifth was above the fourth, the mode or key was said to be *Plagal*. [Authentic.]

PLAGIO'STOMA (Conchology). [Spondylidæ.] M. Duméril uses the term *Plagiostomes* to denote the *Sélaciens*, Cuvier's first family, including the Sharks (*Squalus*, Linn.) and the Rays (*Raia*, Linn.), of the *Chondroptérygiens à branchies fixes*.

PLAGUE. [Pestilence.]

PLAGU'SIA. [Grapsus, vol. xi., p. 362.] *Plagusia* is also Browne's name for a fish: 'The little brown Sole with a pointed tail.' (*Jamaica*, p. 445.)

PLAID, the antient garb of the Scots Highlanders; still worn by the 42nd, 72nd, 78th, 79th, 92nd, and 93rd Highland regiments.

The belted plaid consists of twelve yards of tartan, which are plaited, and bound round the waist by a leathern belt, the upper part being attached to the left shoulder.

In the regulations relative to the clothing and half mounting of the British infantry, it is directed that in a Highland corp serving in Europe, in North America, or at the Cape of Good Hope, each serjeant, corporal, drummer, and private man shall have six yards of plaid once in two years, and a purse every seven years. (James's *Military Dictionary*, 8vo., Lond., 1810.)

In the glossary to Jamieson's 'Popular Ballads,' 8vo., Edinb., 1806, Plaiding is interpreted 'blanketing.' The plaids of the shepherds, the author adds, in the pastoral counties in the south of Scotland are actually a finer sort of blankets; and so are the plaids worn by the wives and daughters of the peasants in many parts of the north-east of Scotland at this day.

PLAIN-CHANT. [PLAIN-SONG.]

PLAIN-SONG, or *Cantus Firmus* (Lat.), or *Canto Fermo* (Ital.), a name given by the Church of Rome to the ecclesiastical chant, which most probably was borrowed partly from the music of the Greeks and partly from that used by the Jews in the synagogue. The *Plain-Song* is an extremely simple melody, if melody it may be called; it admits but one measure, the duple, and only notes of equal value. It is rarely allowed to extend beyond the compass of an octave, and never exceeds nine notes; and the staff on which the notes are placed consists of but four lines. The clefs are those of C and F. To St. Ambrose, archbishop of Milan, the church is supposed to be indebted for the regular form of the Plain-Song, and to the pope St. Gregory, surnamed the Great, for having perfected and brought it into that state in which it still continues to be used in the orthodox Roman church.

PLAIN SAILING. [SAILING.]

PLAINS. All those parts of the dry land which cannot properly be called mountainous are plains, and such compose by far the greater part of the earth's surface. Thus, for instance, it has been estimated that in South America the plains are to the mountainous country as 4 to 1. We are not aware that a similar calculation has been made for the other parts of the world, nor are there perhaps materials sufficiently exact for the purpose.

The word plain has but an indefinite meaning of itself, and seems to be rightly understood only when used in opposition to the word mountains, or when conjoined to the name of some known place, in which case it means the country itself so designated, or the environs of some particular spot. Thus we speak of the cities of the plains, the valleys of the plains, the plains of Lombardy, the plains of Quito, &c.

It were a great error to imagine that by the word plain a perfectly horizontal surface is always understood. In its usual acceptation it means a greater or less extent of country, flat in its general level as compared with a mountainous country. The more perfectly even and horizontal the surface, the better does it deserve to be called a plain, such as the plains of Venezuela and of the lower Orinoco, Mesopotamia, &c. But the surface of the ground may be gently waving, as Salisbury plain, and the Ukraine; or more prominently undulated, as the plain round Paris; or it may be studded with hills, as the plains of the Cassiquiare; or it may be traversed by valleys more or less wide and deep, like that part of France which lies between the Loire and the Garonne; or intersected with deep ravines, as the central plains of Russia, without ceasing on such accounts to be a plain.

Plains have been divided into two classes, high and low; but a moment's reflection will show that such denominations can apply rigorously only to the two extremities of a scale of elevation, at the bottom of which would stand, for example, the delta of Egypt or the llanos of South America (which latter are raised only about 150 feet above the level of the ocean, and in some places even less), and at the top the plain of Antisana, 13,435 feet above the sea-level; whereas the greater number of plains are found at intermediate heights, as the following will show:—

	Feet above the Ocean.
The plains of Hungary	200 to 250
The extensive plains on the north of the old continent from the Schelde to the Yenisei	250 to 300
Plains of Moscow	460
Plains of Lombardy	500
Plains of Lithuania	600
Suabia	900
The plateau of Valdaï	1000
Auvergne	1100
Switzerland between the Alps and Jura	1400
Steppes of the Kirghis	1300 to 1600
Bavaria	1650
Plains of the two Castilles	1800 to 2100
Mysore	2300 to 2600
Table-land of Persia	3800 to 4200
&c.	

Though we generally regard those plains which are the least raised above the surface of the ocean as the lowest, it must not be forgotten that round the Caspian and Aral there are plains of many thousand square miles considerably depressed below the sea-level; as is also the case with the plain or valley of the Jordan.

The term *plateau* has often been given exclusively to elevated plains, but this also is incorrect, inasmuch as by a plateau is sometimes meant a great extent of country considerably raised above the rest of the land, and having its mountains, its plains, and its valleys, as is particularly exemplified in the minor plateau of Albania, and in the great plateau of Central Asia. The latter contains four great chains of mountains, the Altaï on the north, the Thian-Chan and the Huen-lun in the interior, and the Himalaya on the south, between which are the vast plains of Dzoungaria, of Tongout, and of Tibet, with their rivers, valleys, and lakes.

Table-land, properly so called, is an elevated plain rising abruptly from the general level of the country, and being, as it were, the broad and horizontal or gently undulating top of an immense mountain, as the Nilgherry district of India. Sometimes there are several such, set one upon the other, at least on one or two sides, when they are called platforms or terraces, as those on the eastern slope of the Cordillera of New Mexico.

Some writers regard the words plateau and table-land as merely the French and English names for the same sort of elevation. Humboldt is of opinion that these names should be confined to elevations producing a sensible diminution of temperature, and accordingly to such heights only as attain to 1800 or 2400 feet. Some again, as Balbi, give the name of plateau to all high and extensive mountain-tracts.

Generally speaking, the plains of Europe are of middling elevation, the extremes of high and low being principally found in Asia and America. Thus while the great plains of Central Asia, about Ladak, Tibet, and Katchi, and round Koukounoor and elsewhere, attain a height similar to those of Quito and Titicaca, or from 9000 to 12,000 feet, the great marshy plains of Siberia along the borders of the Frozen Ocean are very slightly raised above the sea level, as is also the case with the plains of Bengal at the mouths of the Ganges, the whole of Mesopotamia, the Tehama of Arabia, &c.

In South America, contrasting with the lofty plains of Quito, of Santa Fé de Bogota, &c., are the llanos and the plains of the Amazon; while in North America, the interminable prairies and the low swamps round New Orleans form a striking contrast with the Rocky Mountains and the elevated plains of Mexico.

Of Africa little is known, but there is reason to believe that if the plains of Lower Egypt and part of the Sahara are very low, there may be high plains in the mountainous regions.

Plains differ not only in their elevation, but in the horizontality of their surface and general slope, and in the nature of their soil; which circumstances, together with their geographical position, influence their climate and productions, and give to the most considerable among them a particular character and physiognomy. It may be remarked that the rocky and sandy plains belong almost exclusively to the hot and temperate regions of the old world. The plains of America are generally characterised by their gramineous covering or their vast forests; the Asiatic steppes by a twofold appearance, being in some parts studded with low saline plants, and in others, as in Southern Russia, Siberia, and Turkistan, covered with plants of the families of the Compositæ and Leguminosæ; while the greater part of the European plains are richly cultivated.

We say such are the general characteristics, for there are plains of similar character and physiognomy in very different and widely separated regions of the world. The high land of the Campos Parexis, for instance, in South America, is very similar in physiognomy to the desert of Gobi in Asia. The *Desiertos*, near Coquimbo, are of the same character as the Sahara. The *Puszta* of Hungary resemble the savannas of the New World; and the pampas of Cordova are not unlike some of the Siberian steppes.

Though, as we have said, plains constitute by far the greater portion of the earth's surface, and are very varied in their appearance, there are nevertheless some which are remarkable not only for their extent, but for the peculiarities which distinguish them; peculiarities derived, no doubt, in part from the circumstances attending their original formation, and which no subsequent causes have been able to obliterate. These remarkable plains are known under the names of deserts, landes and heaths, steppes savannas and prairies, llanos, pampas, and selvas (or forest plains) of the Marañon. Deserts having been already described under their particular head, we shall here give a brief account of the others.

Heaths and Landes of Europe.—From Paris to Moscow and Cazan on the one hand, and to Astrakan on the other, is one continued plain, comprising the lowlands of Northern France, the Netherlands, the North of Germany, the whole of Prussia, and the greater part of Poland and Russia, as far as the first terraces of the Ural. Besides which there are many minor plains, as those of Wallachia and Bulgaria, Hungary, Lombardy, &c. The antient civilization of Europe has covered the greater part of its plains with cultivation and rendered some of these lands the richest in the world (the plains of Lombardy); nevertheless there are some spots which seem to defy all human efforts to bring them into cultivation; such are those between the Lower Volga and the Ural, of which we shall speak more fully in describing the steppes, and such are the heaths and landes. Of these, next to those of Russia, the most extensive are in Lapland and West Gothland. But the chief landes and heaths, properly so called, lie in the northwest of Germany. In Lower Silesia, Lusatia, and Brandenburg, there is little else than sand, and also in Pomerania and Mecklenburg, studded with a few hills, numerous lakes, and, along the maritime parts of the latter, having some woods of oak. In Hanover the gentle acclivities are covered with heath, which extends through part of Holstein to the centre of Jutland. The most sterile parts of Hanover however are the landes of Lüneburg and Verden between the Elbe and the Weser, and those of Meppen on the right bank of the Ems. Those of Lüneburg and its vicinity are said to cover a space of about 6000 square miles. These landes are covered with heath, with pine woods, and marshes. On the west of the Ems, about Bentheim, there are also extensive landes covered with swamps and stagnant pools. In the province of the Lower Rhine, in the environs of Monjoie, between Eupen and Malmedy, we again find vast landes coated with heath. In France, of which country about one-twelfth is unproductive soil, there are extensive landes and barren spots. That tract which extends eastward from the right bank of the Adour, and gives its name to the department, consists almost wholly of pools, marshes, and heath, and this sterile plain extends a great way into the department of the Gironde. The shingle plain of Crau, in the department of the Bouches du Rhone [BOUCHES DU RHONE], is well known, and likewise the sterile chalky plain of La Champagne Pouilleuse. In the kingdom of Naples there are considerable landes.

Steppes.—This name, which is Russian, is given more particularly to the extensive plains which lie on the northwest of Asia. Considered as a whole, the steppes have a character quite different from the other great plains of the world, though in different parts they present partially the distinguishing features which characterise the llanos, the savannas, the pampas, the sandy deserts, &c. Generally speaking, they consist of rich pastures intermingled with woods, barren sands, muriatiferous clay, and abounding in lakes, pools, and streams of salt and bitter waters.

From the sea of Azof on the west to the foot of the Little Altaï on the east, there is a band extending, in a north-east direction, from the mouth of the Kuban towards Torusk, where the undulations of the plain prevent the egress of the waters, which, percolating through a highly saline soil, are collected in the hollows into innumerable lakes and pools of salt water, which give a peculiar feature and interest to these steppes.

Further northward, the Siberian plains have a general slope towards the Frozen Ocean, and are intersected by the great rivers Obi, Yenisei, and Lena; between the lower courses of which extend immense frozen marshes, covered with moss, and interspersed with a few sandy and clayey hills crowned with tufts or clumps of stunted birch and other dwarf shrubs.

The greater part of what are properly called the steppes form a considerable part of the country known as Independent Tartary, which is inhabited by the nomadic hordes of the Kirghis Cossacks.

The steppe which lies on the north-west of the Caspian, bounded by the Caucasus, the sea of Azof, the lower course of the Don, and thence to the Ural or Iaïk, is inhabited by the Cossacks of the Black Sea and the Nogay Tartars. The whole of this steppe is characterised as composed of hills of a moving shelly sand, between which are beautiful green pastures, and marshy hollows with reeds and clumps of trees, among which are willows, poplars, and wild olive. There are numerous salt streams and brine pools, barren patches covered with a saline efflorescence, and in many places tufts of saline plants. The fertility of the hollows seems due to a sheet of water which, coming from the hilly range called Obstcheï Sirt, a branch of the Ural, flows immediately below the sandy surface, being probably retained by an impervious substratum.

Between the Iaïk on the west and a low ridge of hills on the east, which may be regarded as a south-eastern continuation of the Ural, and which extends between the Aral and the Caspian, is another steppe similar in character to that already described. It is occupied by the Kirghis of the little horde; while what is called the central or middle horde ranges over the vast steppe contained between the lake Aral and the Sir on the south, the low hills already mentioned on the west, the Ouloustaou and Naourgiuskaia ranges on the north, and the Sarasou on the east. With the exception of the Sir, all the waters of this great basin lose themselves in the sand, or in lakes more or less salt, the principal of which is the famous Aksakal Bari.

To the north of the last-mentioned steppe lies the great steppe or plain of Ischim, which extends from the eastern slope of the southern extremity of the Ural, across the Tobol, to the Irtish. It takes its name from the river Ischim, which, dividing it nearly in two, falls into the Irtish near Petropavloffskoï. The north-east part of this steppe towards Tara, on the left bank of the Irtish, is covered with dense forests abounding in game and rich in furs. Sables are in great number, but of indifferent quality; besides which there are bears, wolves, foxes, ermines and squirrels, beavers, lynxes, gluttons, and others, and still further north are reindeer. The Kirghis of the middle horde sometimes encamp in the plains of Ischim, of similar general character to those already described.

Crossing the Irtish, we enter the great steppe of Baraba, occupying all the space between that river and the Upper Obi. This steppe, lying nearer the foot of the mountainous district of the south and east, contains numerous lakes and pools, particularly in its southern portion. This district is in many places extremely fertile, and along the water-courses the grass grows luxuriantly. The north and north-west parts are wooded, but the more southern, those lying along the Irtish and towards the Altaï, have few trees, and are less fertile. The lake Tschany, the largest and nearly the most northerly of the great group of lakes, abounds in fish; the surrounding country is extremely fertile, and abounds in aquatic game, the chief nourishment of the Tartar tribes who live dispersed along the frontiers of this canton. Interspersed with the sandy, barren, and saline spots, are many places where there is excellent land for tillage, in which grain and flax succeed well. In those parts of this district which suit them there are great quantities of elks, roebucks, and wild boars. The Kirghis of the great horde occupy a more mountainous country to the south of the Sarasou.

Besides these great steppes, there are numerous other patches of greater or less extent and similar general character in Central Siberia, reaching from the Ural to the Lena.

Previous to the nominal subjection of the wandering hordes to Russia, that country had lines of fortified posts for its protection against these predatory bands; but now that the different hordes of Kirghis acknowledge the supremacy of Russia, and their several chiefs are paid by the Russian government, many of these posts have been abandoned, and open villages are now multiplying along the roads by which the Russian caravans travel towards Kiachta and in the direction of the mining districts of the Altaï. The inhabitants of these villages, some of which are very large, are the only stationary population of the steppes. The wandering tribes are very numerous, and are continually shifting their ground to find food for their numerous cattle, consisting of horses, camels, horned cattle, sheep, and goats. These herds, together with the booty taken in their incursions upon the Calmucks and others, form the sole wealth of the Kirghis, who lead easy and independent lives.

The extent of the steppes properly so called, excluding the marshy plains of the north, may be about 1,000,000 square miles.

Savannas or Prairies.—The central part of North America, from the Frozen Ocean to the Gulf of Mexico, may be regarded as one continuous plain, divided by a low watershed into the north-eastern basin, whose waters flow into the Polar Sea, Hudson's Bay, and, by the great lakes and St. Lawrence, into the Atlantic, and the basin of the Missouri and Mississippi, whose waters fall into the Gulf of Mexico.

This immense tract of country, estimated by Humboldt at 2,430,000 square miles, is extremely varied in climate, in character, and productions; for while the northern portion, which is watered by the Mackenzie, Back's River, the Churchill, and the Saskatchewan, is condemned for the greater part of the year to all the horrors of an iron-bound soil and stunted polar vegetation, palms and other tropical trees grow at the extremity of the southern portion. It is this southern basin, watered by the mighty Missouri and Mississippi, with their abundant affluents, that contains those extensive grass-covered tracts, the savannas and prairies. They lie chiefly on the western side of the Mississippi, though along the Illinois river they are found to the extent of 1,200,000 acres, and also in other parts of the basin east of the Mississippi. But the whole of the territory from the right bank of the Mississippi to the mountains is not one continued savanna, or even an unbroken horizontal plain; for it is rises towards the mountains, many of whose spurs are reached by the Missouri, which has erroded their extremities into bluffs. These ridges form the boundaries of the basins of the great tributary streams, the Platte, the Kanses, the Osage, the Arkansas, &c. Woods are also occasionally met with along the Mississippi and other watercourses, as likewise in Arkansas; and in some places, as between the Platte and the Missouri, there are extensive surfaces of moving sands resembling those of the African desert. Elsewhere again, as from the mouth of the Arkansas along the Mississippi, a distance of 450 miles long and 40 miles broad, the soil is all swamps and pools, with abundance of trees: this is also the case above Illinois lake and elsewhere. Along the upper Missouri, from the territory of the Mandans, is an interminable plain without trees or shrubs except in the marshy spots. In various parts, but more especially along the borders of the great plain, and in Arkansas, salt is found.

The savannas, or prairies, as they are also called, are divided by Flint, an American writer, into three kinds:—1, the heathy or bushy, which have springs and are covered with small shrubs, grape-vines, &c., very common in Indiana, Illinois, and Missouri; 2, dry or rolling, generally destitute of water and almost of all vegetation but grass; they are the most common and extensive: the traveller may wander for days in these vast and nearly level plains without wood or water, and see no object rising above the horizon; 3, the alluvial or wet prairies, the smallest division; they are covered with a rich vegetation of tall rank grass. The soil is deep, black, friable, and fertile, and abounding in pools without issue, left by the floodings of the rainy season. It is over the second kind chiefly that the bisons wander in herds of from 40,000 to 50,000. Stags, or more properly wapitis, are also very numerous; and between the Arkansas and Red rivers there are droves of wild horses. Deer are also numerous; and along the borders of the Missouri, above the Platte, or shallow river, the antelope abounds in herds of several hundreds. In summer wild goats are seen in vast numbers along the Mississippi. Above the Mandan villages are grizzly bears; and badgers, beavers, otters, foxes, wolves, racoons, opossums, squirrels, porcupines, and skunks inhabit the same region. To this enumeration of Warden's and Flint's, Lyell adds the jaguar. The waters teem with alligators and tortoises, and their surface is covered with millions of migratory water-fowl, which perform their annual voyage between the Canadian lakes and the shores of the Mexican Gulf.

Llanos.—The whole interior of South America, from the mountains of Caracas on the north to the Straits of Magalhaens on the south, is divided by comparatively low transverse ridges, running east and west into three great basins; that of the Orinoco on the north, that of the Amazon or Marañon in the centre, and that of the La Plata on the south. The first comprises the llanos, vast plains occupying a surface of 260,000 square miles. They may be divided into two principal portions: the first, beginning at the mouths of the Orinoco, extends westward as far as the Andes of New Granada, being bounded on the north by the Caracas, and on the south by the mountainous group of Parime and the Rio Apure, an affluent of the lower Orinoco. The other portion of the llanos, which is twice as extensive as the first, reaches from the Apure on the north to the Caqueta (an affluent of the Marañon) on the south; having the Andes on the west, and the sierra of Parime and the Orinoco on the east. The inclination of these plains is to the east and south, and they are traversed by many streams, which, taking their rise from the eastern slope of the Andes, bear their tributary waters to the Orinoco. As the medium height of the llanos does not exceed 200 feet, the course of the rivers is very slow and often scarcely perceptible.

The chief characteristic of the llanos, says Humboldt, is the absolute want of hills and inequalities, the perfect level of every part of the soil. Often in the space of 270 square miles there is not an eminence of a foot high. This resemblance to the surface of the sea strikes the imagination most powerfully where the plains are altogether destitute of palm-trees, and where the mountains of the shore and of the Orinoco are so distant that they cannot be seen. This unvarying equality of surface reigns without interruption from the mouths of the Orinoco to the Villa de Aurore and Ospinos, under a parallel of 540 miles in length, and from San Carlos to the Caqueta, on a meridian of 600 miles.

There are however, notwithstanding this uniformity of surface, two kinds of inequalities in the llanos. The first, called *brancos*, are horizontal banks of sandstone or limestone standing four or five feet higher than the rest of the plain, and sometimes many leagues in length. The second kind of inequality, called *mesa*, consists of convex eminences rising to the height of a few fathoms.

The llanos have different names in different parts: thus, from the Mouth of the Dragon, the llanos of Cumana, of Barcelona, and of Caracas or Venezuela, follow from east to west, when, turning southward from 8° N. lat., between the meridians of 67° 40′ and 70° 40′, we find the llanos of Varinas, Casuare, the Meta, Guaviaro, Caguan, and Caqueta. All these are again subdivided.

The aspect of the llanos is somewhat dissimilar in different places; but the greatest difference depends upon the seasons. The local dissimilarity arises chiefly from the nature of the palm-trees scattered about, which vary in different places, and also from the greater or less abundance and variety of the dicotyledonous plants which are intermixed with the grasses, the height of which latter is also very unequal, being sometimes only a few inches at a distance from the watercourses, and rising to a height of four feet in their vicinity. In this high grass the jaguar, or American tiger, lurks to spring upon the mules and horses that cross the plain. But the season of drought or of rain entirely changes the aspect of the greater part of the llanos. In the rainy season, says Humboldt, the llanos display a beautiful verdure, but in the time of great drought they assume the aspect of a desert. The grass is then reduced to powder, the earth cracks, the alligators and great serpents remain buried in the dried mud, till awakened from their long lethargy by the first showers of spring. These phenomena are observed on barren tracts of fifty or sixty leagues in length where the llanos are not traversed by rivers.

The principal and almost the only trees of the llanos are different varieties of palms. The *Corypha tectorum*, or Palma de Cobija, solitary or in clumps, rises here and there as a landmark through these trackless plains. It is chiefly found in the llanos of Caracas from Mesa de Peja, as far as Guayaval. Farther north and north-west, near Guavare and San Carlos, its place is taken by another species of the same genus. Other palm-trees appear to the south of Guayaval, especially the *Piritu*, with pinnate leaves, and the *Murichi*, whose beautiful verdure, at the period of the greatest drought, contrasts with the mournful aspect of the grey and dusty leaves of the cobija. Two or three other species of trees besides palms are also found in the llanos, and it is round these clumps that the llanos are the most fertile.

The great wealth of the llanos consists in the numerous herds which they feed. The first horned cattle were let loose in these extensive pastures by Christoval Rodriguez, about the year 1548, since which time they have increased to almost countless numbers. About 98,000 head of cattle are said to wander in the pastures round Calaboza. But, according to M. Depons, there are, from the mouths of the Orinoco to the lake of Maracaybo, 1,200,000 oxen, 180,000 horses, and 90,000 mules, the annual produce of which herds is estimated at about 5,000,000 francs. The richest proprietors are said to mark as many as 14,000 head every year, and sell to the number of five or six thousand. According to official documents, prior to the Revolution the exportation of hides from the whole capitania-general amounted annually, from the West India Islands alone, to 174,000 skins of oxen and 11,000 of goats; and as in this account no mention is made of fraudulent dealings in hides, it would appear that the number of 1,200,000, stated above, is much underrated.

All the parts of the llanos are not equally favourable for the breeding of mules and oxen; but in some of those places, where the herds are less numerous, the pastures are so fertile as to furnish meat of an excellent quality for provisioning the coast.

The horses of the llanos are not very large, but are descended from a fine Spanish breed. Deer are natives of these plains.

The greatest curiosity of the llanos are the gymnoti, or electrical eels, which live in the pools as well as in the rivers of this part of South America.

We may also mention, as distinguishing the llanos from the pampas, and from the plains of North America, the Sahara, and the steppes of Asia, the total absence of any formation of muriate of soda.

Pampas, from an Indian word, which, in the Quichua language, signifies properly a flat, is the name given to extensive plains in the southern and central parts of South America. Those which lie to the south and north-west of Buenos Ayres are called, the former the Pampas of Buenos Ayres, or simply the Pampas, and the latter the Pampas of Cordova. The plains to the south of the province of Chiquitos bear the name of the Pampas de Huanacos. There is also one more to the north, between the river Beni and the river Marmore, a tributary of the Madeira; and lastly, to the north between Huallaga and the Ucayal there is another, called the Pampas del Sacramento.

The Pampas of Buenos Ayres are bordered on the west by the forests which lie along the base of the Andes of Chile; on the east by the Atlantic; on the south by the Rio Negro and Patagonia, the interior of which, though little known, seems to be of the same nature with the pampa itself; and on the north-east by the Rio de la Plata. In the direction due north the pampa narrows between the Parana and a ridge coming from the Andes, called the Sierra de Cordova.

This region, reckoning to the foot of the mountains on the west, occupies a surface of about 315,000 square miles. This plain has no general slope, or rather it slopes so gently towards the east, that the slightest inequalities, together with the absorbing nature of the soil and the great evaporation, are sufficient to arrest the course of the waters; so that, with the exception of the rivers Colorado and Negro, which come from the Cordilleras, and which traverse the southern part of the pampas, and the Salado, a small stream which flows into the Rio de la Plata at its mouth, the pampas have no running waters, but, instead of them, a great many shallow pools, of which the water is often brackish. There is one at about four hundred and fifty miles from Buenos Ayres, in the direction west-south-west, always filled with salt, from which the city of Buenos Ayres was yearly supplied before the port was thrown open to foreigners. The southern part of the pampas is sandy, with patches of saline plants and stunted trees; the northern parts are covered with grass, supplying food to large herds of cattle and wild horses, the descendants of those first introduced by the Spaniards. It is said that several million head of cattle and about half as many horses feed on the Pampas of Buenos Ayres. There are also wild beasts.

This plain is traversed by a road which leads from Buenos Ayres to Chile, along which the traveller meets with huts, which form stations, distant from each other about seven or eight leagues. The journey may be made on horseback or in a carriage, but it is sometimes dangerous, on account of the Indians.

The Pampa of Cordova extends from the right bank of the lower Parana to the Sierra de Cordova at the west. On the north it joins the sandy plains or *travesia* of Santiago del Estero.

This pampa resembles that already described in all things, excepting being traversed by a greater number of streams All these streams however, with the exception of the Rio Salado, which falls into the Parana, lose themselves in the sands, or end in marshes and lakes without issue, and which in the country are called *Lagunas*. Such is particularly the case with the Rio Dulce, which, rising in a fertile valley on the eastern slope of one of the lateral chains of the Andes, passes by S. Miguel de Tucuman and Santiago, and finally empties itself into the Lagunas de las Porongos; the same is also the case with the Rio Primero, on which is situated Cordova, the best of all the towns of Tucuman, the residence of a bishop, and where the Jesuits had formerly a celebrated university.

Throughout the whole of the country between the Parana and the mountains to the west, from Chaco on the north to the extreme southern extremity of the Pampa of Buenos Ayres, says Azara, there is neither river, lake, nor well that is not brackish. Even the Pilcomayo and the Vermejo partake of this saltness; and the same author assures us that he has seen in lagunas, dried up by the heat, a layer of Epsom salts above three inches in thickness.

The inhabitants of the fertile valleys lying to the west and north of the plains of Tucuman, similar in some respects to Little Bucharia, rich in their flocks, without ambition, and without care, close the day in rural amusements worthy of being sung by Theocritus and Virgil. It is nevertheless true that there are spaces of many square leagues in extent condemned to absolute sterility. The traveller may pass for days together over sands and stones, between which there spring up here and there some saline plants, without meeting with any other objects than a few isolated huts on the borders of some brackish stream; these barren districts are generally designated by the term *travesia*.

Pampa of Huanacos.—Leaving the Pampa of Cordova on the south, and travelling through forests swarming with bees, which extend beyond the Rio Dulce and the Salado, we enter on the territory of the Abipones, a race of very warlike Indians; after which, crossing the Rio Vermejo, we gain the plains of the Gran Chaco, occupied by more or less savage indigenous tribes. This region is traversed by the Rio Pilcomayo, which, passing near the mines of Potosi, falls into the Paraguay below the city of Assumption. To the north lies the Pampa de Huanacos, adjoining the province of Chiquitos, bounded on the east by the great laguna of Xarayes, through which passes the frontier of Brazil; on the west by the heights of Santa Cruz de Sierra, and on the north by the forests of the province of Moxos and the sandy plateau called Campos Parexis.

Pampa de Moxos is on the north of the province of Moxos, between the rivers Beni and Marmoré; and between the junction of this latter and the Guapore, another source of the Madeira, are other pampas of considerable extent.

Pampa del Sacramento.—This pampa is situated on the north-west of Cuzco. It differs from the other pampas in having a more tropical vegetation, and in its soil not being saline. It occupies a surface of from 54,000 to 63,000 square miles.

Such are the principal pampas of South America; and, if we include a part of Patagonia as being of the same nature with the pampas, we shall have, without reckoning the pampas of Moxos and Sacramento, and a number of spots of similar character but less extent, an almost uninterrupted band, extending from the Campos Parexis, in latitude 15° S., to the bay of St. George in 45°, or about 2800 geographical miles long and 300 wide, or a surface of 840,000 square miles of plain, partly sand, and partly marshy and saline, and producing hardly anything but pasture and a few stunted trees. Humboldt estimates the whole of the pampas of Rio de la Plata and Patagonia at 135,200 square leagues of 20 to the degree.

The *Selvas*, or forest-covered plain of the Marañon.—Independent of the vast forests which cover great part of the plains of North America, particularly on the east of the Mississippi, there is the immense plain of the Marañon in South America, extending over a surface of 2,340,000 square miles, of which about 719,000 are covered with primeval forests, the rest of the space being occupied by the waters, and by open patches of a character similar to the llanos and savannas, though little known. We merely mention this region here as one of the most extensive continuous plains in the world.

If the great plains we have described owe their peculiar character to climate and situation, a very little reflection will suffice to show the immense influence which they in their turn must exercise over the climate of the regions contiguous to them, and the great modifications they must effect on mere astral temperature. Indeed the curves of the isothermal lines sufficiently prove that the several climates of the earth depend on the joint action of solar irradiation, and the magnitude, distribution, conformation, soil, and productions of the solid parts of the globe, and the extent and relative position of the great bodies of water by which they are surrounded. Nor have the vast plains of Asia and America performed a less important part in the moral history of mankind, whether as having favoured or opposed the emigrations of nations and the progress of civilization.

PLAN. This word (which is the same as Plane) means a representation of a plane section of any building, country, &c. Usually it is to the horizontal section that the term is applied, the words section or elevation being used to signify the vertical plans. A map is not properly a plan, but a Projection, unless the country represented be perfectly level: nevertheless the term is commonly applied to maps of very small portions of a country, as an estate or a town.

PLANA'RIA, Captain Brown's name for a genus of fossil shells which are discoïd, and much resemble *Planorbis;* but the outer lip is reflected; and the form is considered to have been marine. Mr. Lea notes a new species, *Planaria nitens*, from the Claiborne beds, Alabama. (*Contributions to Geology*.) *Planaria* had been used by Müller, Lamarck, and others, to designate a genus of animals placed by Cuvier among his *Intestinaux Parenchymateux*, but they do not live in other animals, and are only found in fresh or salt waters.

Dr. Johnston describes several British species of *Planaria*, all marine, in the 3rd and 4th vols. of the *Zoological Journal*.

PLANAXIS. [Entomostomata, vol. ix., p. 452.]

PLANE. [Straight Line and Plane.]

PLANE, INCLINED. [Inclined Plane.]

PLANE. Botanists enumerate several species of this tree, of which two only deserve notice here.

The *Oriental Plane*, or *Chinar*, is a native of Asia Minor and the Levant, and, according to Royle, it stretches eastward as far as Cashmere. Its favourite spots are low situations, where the soil is rich and humid; as it ascends the sides of mountains it soon becomes scrubby, and degenerates into a bush. In favourable situations it becomes one of the most noble of all trees, with deeply divided leaves, glossy and bright green, and huge branches which spread in all directions from its massive trunk, forming in eastern countries the most agreeable of all shade. It appears to acquire a very great age, was extensively employed by both the Greeks and Romans for avenues and other purposes of ornament, and is to the present day the handsomest of all the hardy deciduous trees in cultivation. It is also perfectly suited to the climate of England, suffering nothing from our winters or inclement and variable springs. Nevertheless by some strange inadvertence it is rarely seen with us in comparison with the next species, which is in all respects inferior. Its timber is fine grained, hard, and well suited to such kinds of joiners' work as do not require strength, for which its brittleness renders it ill suited. When the wood is very old it is said to acquire dark veins, and to assume the appearance of walnut.

The *Occidental Plane* is also a tree of very large size and of considerable beauty, although inferior to the Oriental. It is found over a great part of the North American Union, extending even into Canada, but its favourite range is in the moist rich grounds of the banks of the Ohio and in the Southern states, whence it straggles into Mexico. Its leaves are angular rather than fingered, by which it is readily known. In the United States it is called Buttonwood, and sometimes the Cotton-tree. A tree of this species is asserted to have existed on a small island in the Ohio, which, at five feet from the ground, measured forty feet four inches in circumference. This is the species found in Hyde Park, and in other public places near London, and is that usually planted in England, to the climate of which it is however ill suited. The wood is seldom well ripened, and is therefore liable to injury in winter, and it is continually damaged by our spring frosts; the consequence of which is that the trees grow slowly, and have always a shabby appearance, few of their leaves being free from brown and dead portions, unless in very favourable seasons. The multiplication of it ought therefore to be stopped, and that of the Oriental Plane substituted, if our planters have any regard to the beauty of the effect produced by their operations. A more unsuitable plant for the London parks than the Occidental Plane could hardly be selected.

Both species have the singular property of throwing off their old bark in hard plates of irregular size and form.

PLANE. [Mississippi, River.]

PLANET (ἀστὴρ πλανήτης, a wandering star), **PLANETARY THEORY, MOTIONS, PERTURBATIONS, INEQUALITY, &c.** The term planet was first used as one of distinction between the stars which preserve their places, or seem to do so, and those which have a sensible motion, and, as is now known, about the sun. The etymology would oblige us to include comets—many of the stars, which have small motions of their own, or proper motions, as they are called—all those double stars which revolve about each other—and all the satellites which revolve about other planets. As discovery proceeds, it is likely that every body in the universe will be found to be planetary. The word however has changed its meaning, and is used to stand for a heavenly body which makes successive revolutions about our sun. It thus includes—the old planets, Mercury, Venus, Mars, Jupiter, Saturn (excluding the sun and the moon, the most easily discovered planets of all)—the planet of Copernicus and Galileo, on which we live—the new planets, Vesta, Juno, Ceres, Pallas, and Uranus;—three comets certainly, those of Halley, Encke, and Biela, and probably many others.

The plan of this work leaves us little to say under so general a term as Planet, and that little consists mostly of references, and explanations of isolated points. The order of discoveries connected with the subject, so far as it is matter of history, must be looked for under Astronomy. It is impossible to separate the history of one part of astronomy from that of another: the fixed stars, on which all celestial measurements depend, must accompany the planets in every account of the latter; the mathematical and physical considerations which give rise to our power of predicting the motions and places of the planets, apply equally to those of the moon and comets.

By a Planetary Theory was once meant any hypothesis which serves to explain the motions of a planet, as actually perceived. Thus there was one theory of Mercury, another of Venus, &c., each (without connection with the rest) expounding the nature and magnitude of all the suppositions which must be superadded to that of the simple circular motion round the sun, in order to enable the theorist to predict the planet's place at any given future time. At present, by the theory of a planet is meant the deduction of its motion from the theory of gravitation. Given the places of all the bodies of the solar system at any one moment, together with their velocities and the directions of their motions, the assumptions of the theory of gravitation are found sufficient to deduce tables which almost rival observation itself in the accuracy with which predictions can be made; for an instance, see Moon. When tables are constructed with such fundamental data only, they are called *theoretical:* but if some of those details which should have been deduced from the theory of gravitation have been deduced from observation, the tables are then partly *empirical*. For the treatment of the theory of gravitation as a question of physics, see Attraction: for the deduction of the character of the main inequalities of the planetary motions, and most points connected with the detailed results of that theory, see Gravitation: for the results which are particularly connected with the secular inequalities, and the reasons which we have to infer the permanence of the whole system, unless acted on by some new and external cause, see Solar System. See also the general considerations under the word Theory.

The Planetary Theory, it must be remembered, in the sense in which those words are now understood, explains only the motions of the planets round the sun. A spectator situated on the last-named body would find it sufficient to predict the place among the stars, of every planet at every time: or a terrestrial astronomer might assign by it the places of the planets as seen from the sun, which are called *heliocentric* places. But our own circumstances, as being ourselves revolving about the sun, cause the apparent planetary motions to vary most materially from the real ones, and the *geocentric* places (or places as seen from the earth) to differ literally *toto cœlo* from the heliocentric places. Thus, as seen from the sun, a planet moves from west to east, always: as seen from the earth, it sometimes moves from east to west. As to this point, the circumstances of our day are, in regard to the astronomical education of the world at large, a complete reversal of those which preceded the time of Newton. Formerly, the apparent motions were well known to those who knew anything; the real motions were matter of dispute: now, every well educated boy of fourteen has a very good notion of the real motions, while few, except astronomers, could distinctly explain the apparent ones, and maps of them are quite out of date. To explain these motions here would require us to introduce the contents of another article; the whole of what is necessary on this point will be found in TROCHOIDAL CURVES, the preliminary considerations being found under MOTION.

The places of the principal planets are usually given in the almanacs, at intervals of several days, in a manner which is sufficient to find them in the heavens. In the 'Nautical Almanac' is now to be found a Greenwich meridian ephemeris of every planet for every day in the year, in which the places are predicted to the smallest quantities, so that the reduced observation of any one day affords an immediate comparison of the theoretical tables with the fact.

PLANETA'RIUM. [ORRERY.]

PLANIPENNES, one of the sections of insects into which Latreille divides the order Neuroptera. The species of this section have the antennæ composed of numerous joints, always larger than the head; the mandibles are well developed, and the posterior wings are nearly equal in size to the superior; they are either naturally extended or have the anterior portion simply folded beneath: the reticulations of the wings are very distinct, and they are naked; the maxillary palpi are usually filiform, or slightly thickened at the apex, shorter than the head, and four-jointed.

This section is divided into four families:—

1st. The *Panorpidæ*, the species of which are distinguished by all the tarsi being five-jointed, and the anterior portion of the head drawn out in the form of a snout or proboscis.

It consists chiefly of the Linnæan genus *Panorpa*, which is now divided into the following genera:—*Nemoptera*, Latreille; *Bittacus*, Lat.; *Panorpa proper*, and *Boreus*, Lat.

The *Panorpa communis* of Linnæus is a common insect in hedges and in woods. It is about three-quarters of an inch in length, black; the snout and apical portion of the abdomen red; the elytra are irregularly spotted with black.

Of the genus *Boreus* we also have an example in this country; the *B. hyemalis*, a small insect, which is found usually in moss, and during the winter time.

2ndly. The *Myrmeleonidæ*. In this family the antennæ are more or less suddenly incrassated at the apex; the head is transverse, and the eyes project considerably; there are six palpi, of which the labial are usually the longest and thickened at the apex; the first segment of the thorax is small; the anterior and posterior wings are equal, elongated, and, when closed, meet at an angle like the roof of a house; the abdomen is usually elongated, and furnished at the apex in the male sex with two appendages; the legs are short. These insects are found in the warmer portions both of the Old and New World: they form two genera according to Fabricius, *Myrmeleon* and *Ascalaphus*. The curious habits of the larva of the *Myrmeleon Formicarium*, a European insect, though not found in this country, have often attracted the attention of the naturalist. This insect is of a greyish colour, and short and broad form; the head is small, and furnished with a large pair of sharply pointed mandibles, which serve both to seize its prey and to extract the juices upon which it lives. The number of ants destroyed by this larva has obtained for it the name of Ant-lion. Although provided with six feet, says Latreille, it moves very slowly and almost always backwards. Thus, not being able to seize its prey by the celerity of its motions, it has recourse to stratagem, and lays a trap for it in the form of a funnel-shaped cavity which it excavates in the ground, at the foot of a tree, old walls, or in a bank exposed to the south. Having completed this cavity, it hides itself at the base, in the mould or sand, and waits until some insect is precipitated into it; if the insect endeavour to escape, or be at too great a distance for it to seize, the Ant-lion showers a quantity of sand upon the victim by means of its head and mandibles, and thus succeeds in overwhelming it and bringing it within reach of its mandibles. Having sucked the juices from the carcass, the remains are thrown at a distance from the domicile. When about to pass into the pupa state, the Ant-lion encloses itself in a white silken cocoon, mixing grains of sand with the outer surface. The perfect insect is about one inch in length; blackish, spotted with yellow; the wings are transparent, and have black nervures spotted with white; some dusky spots and one whitish spot are observable near their extremity.

The third family consists of the *Hemerobiidæ*, which are chiefly distinguished from the last group by their filiform antennæ; they moreover differ in having only four palpi In some (the genus *Hemerobius*), the wings when closed meet at an angle, as in the Myrmeleons, whilst in others (*Sembles*) they are horizontal.

Hemerobius perla is common in our gardens, and is often seen flying about the lilacs, especially towards the evening. It is rather more than half an inch in length, of a green colour, and has transparent wings with numerous green nervures; its eyes resemble small globes of gold; when touched, it emits a very disagreeable odour.

To the fourth family Latreille applies the name *Termitinæ;* it includes those Neuropterous insects which have a semi-complete metamorphosis; they are terrestrial and active, and are either carnivorous or gnawers in all their states.

The *Mantispæ*, which Latreille places in this division, differ much from other insects of the order in having large anterior legs formed like those of the Mantidæ; their tarsi have never more than four joints; the mandibles are strong, and the wings have no folds; the inferior pair are either smaller or equal to the superior wings in size.

Besides the genus *Mantispa*, this family includes *Raphidia*, *Termes*, and *Psocus*.

The last family of the *Planipennes* is the *Perlidæ*, in which the tarsi are three-jointed, and the mandibles almost always small and partly membranous; the inferior wings are wider than the others, and are folded when not in use. This family contains the genera *Perla* and *Neumora*. The larvæ of the Perlæ live in the water, and inhabit sheaths which they construct by joining together various substances by means of a silken web which they spin.

PLANISPHERE. This term originally stood for any representation of all or part of the sphere on a plane; it is now out of use, at least in that sense. It has partially however been retained (and it would be desirable that this meaning should become fixed and general) to signify any contrivance in which plane surfaces moving on one another fulfil any of the uses of a celestial globe.

The instrument* which we proceed to describe is one which, at or near a given latitude, is, for ordinary uses, that is, for finding the position of the heavens at any one moment, much more easily used than the celestial globe, and very much less expensive. A circular disk of pasteboard, on which the stars visible in our latitude are laid down, turns on a second disk, round which are the days of the year on one circle, and the hours of the day on another. A third and hollow disk turns upon the same pivot, the hollow part being so cut that the portion of the heavens which it shows is precisely that which is visible at one time in the latitude of the instrument: the points of the compass are marked round the rim of the hollow disk, or of the horizon. The effect is, that by setting the disk which contains the stars to the day of the year, and the hollow disk to the hour of the day, the part of the heavens visible at that day and hour is distinctly shown. The time at which any star rises, culminates, and sets can be immediately found within a minute. We strongly recommend this instrument to those who study the face of the heavens, as being much superior to the globe.

PLANORBIS. [LIMNEANS, vol. xiii., p. 498.]

PLANORBULI'NA, M. D'Orbigny's name for a genus of microscopic *Foraminifera*. [FORAMINIFERA, vol. x., p. 348.]

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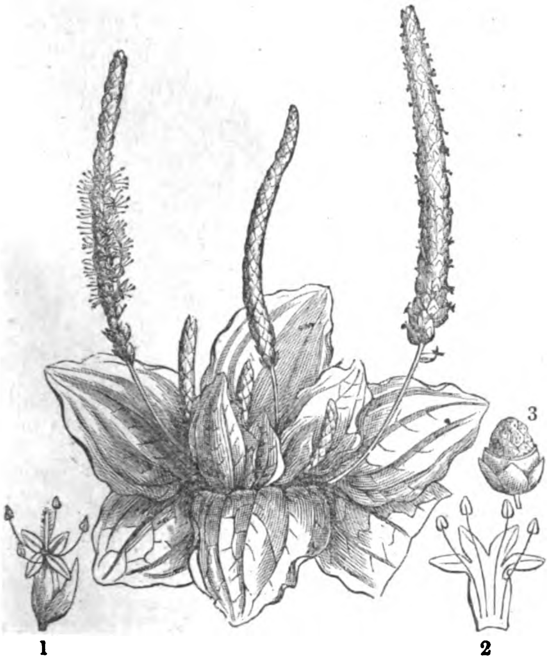
* These planispheres are very well manufactured by Messrs. Smith and Sons, 172, Strand. We mention this, because some which we have seen are very erroneous: we remember one in which the equator cuts the horizon a great way from the east and west points.

PLANTAGENET. [HENRY I., II.]

PLANTAGINA'CEÆ are a small natural order of plants belonging to the monopetalous exogenous series, principally characterised by having a superior one-celled simple ovary, terminated by a simple linear stigma, many seeds, with a minute embryo in the midst of much albumen, and stamens with extremely weak filaments. They consist of herbaceous or suffrutescent plants, of which the *common Ribgrass*, or *Plantago lanceolata*, may be taken as the type, and are of no material importance to man. The mucilage surrounding the seeds of some is occasionally used in the stiffening of muslins by the manufacturers, and the *P. lanceolata* is sown on sandy bad lands as a material for sheep food. In structure Plantago possesses the rare peculiarity of having the cavity of its simple carpel divided into two by a vertical additional plate.



Plantago major.

1, a flower: 2, a corolla cut open; 3, a seed-vessel, with the upper half of the pyxis removed.

PLANTI'GRADA. [CARNIVORA, vol. vi., p. 307.] The genera placed by Cuvier in this tribe are *Ursus* [BEAR], *Procyon* (Racoons), *Ailurus* [PANDA], the *Benturongs* (*Ictides*, Valenc.), the *Coatis* (*Nasua*, Storr). (Here, he thinks, can hardly be placed the *Kinkajous*, or *Pottos*, Cuv. (*Cercoleptes*, Ill.), which join to plantigrade motion a long and prehensile tail, like that of the *Sapajous*, a short muzzle, a slender and extensible tongue, two pointed molar teeth in front, and three tubercular molars backwards.) *Meles*, Storr [BADGER; MELES], *Gulo*, Storr [GULO], and the *Ratels* (*Viverra mellivora*, Sparm.; *Viv. Capensis*, Schreb.), which have one false molar less in each jaw than the *Grisons*, and their tubercular molar above but little developed, so that they approach the *Cats* in their teeth, whilst their external form is that of the *Grison* and the Badger; the legs being low, and the feet plantigrade, with five toes on each foot, armed with very strong claws, &c. (*Règne Animal.*)

PLANTING and PLANTATIONS. Planting is the operation of placing in the soil the roots of a plant which has been previously removed; and the preservation of the roots is the first thing to be attended to. It should be kept in mind that the *spongioles*, or delicate extremities of the fibres, are the parts by which the chief supply of food from the earth is absorbed by the plant. Their tissue being tender and almost naked, they are very susceptible of injuries from mechanical action; and being adapted for performing their functions in a humid medium, they readily suffer from being kept for any length of time exposed to free air and drought. In taking up the plants therefore, the roots should be loosened in such a manner as to receive the least possible violence in the operation. Plants in pots can be shifted from one place to another without exhibiting symptoms of deranged functions; and if it were possible to preserve the spongioles of a large tree as entire as those of a plant in a pot, the same successful result would follow. But as it is next to impossible to do this, we can only attempt to preserve them as far as circumstances will permit. If the tree be large, a trench should be opened beyond the extremities of the roots, of sufficient width and depth to allow the process of undermining to be freely carried on. The roots should be gradually set at liberty by a round-pronged fork, the prongs tapering so as to be easily inserted, yet not by any means so sharp as to prick the roots. As the fork is being used, the soil from among the roots will fall into the open trench, but as it accumulates there it must be cleared away, and at the same time the portion of roots set at liberty will require to be slightly tied together with pieces of matting, and, if necessary, supported by temporary stakes, or held to one side by an assistant, whilst the planter proceeds in liberating others. If there be, as is frequently the case, a tap-root extending to a much greater depth than the other roots, and if the latter have been carefully preserved during the operation, the tap-root may be dispensed with, for it could only be raised in a mutilated state, owing to the great solidity of the earth at such a depth.

Although it is very desirable to preserve the greatest possible quantity of sound roots, yet all that are bruised or lacerated should be cleanly amputated up to the sound parts. Cross-roots are apt to gall the others when they become large, and therefore the sooner they are removed the better. When the plants are young and in the course of being occasionally removed in a nursing state, all irregularities in the roots should be corrected, which can then be done with comparatively little injury, as the roots of young plants bear a greater proportion to the top than seems to be the case at a more advanced period of growth, and the loss of any of them is consequently felt less. In the early stage of rearing trees, while the proportion of roots predominates, it may be found advisable in various cases to shorten not only the tap-root, as above mentioned, but also judiciously some of the other strong roots, in order that subdivisions of a more fibrous nature may be produced, and a number of rootlets substituted for large root-branches. Even in the case of large trees this principle has been acted upon for centuries, and latterly it has been strongly advocated and put in practice for the purpose of producing immediate effect in park or landscape scenery. A trench is cut out round the tree, and the roots shortened wherever they happen to traverse this trench, so as to leave it quite clear. This being done, the trench is filled up, either with its own excavated soil, or, in very particular cases, with fresh soil. The tree has still a sufficient number of undisturbed roots to keep it alive; and in fact it ought not to be merely kept alive, but as many roots should be left as will ensure its continuing in a healthy though not a vigorous state of growth. In the course of a year or two after this operation has been performed, a number of young roots will have been protruded from the various amputations into the loosened soil of the trench; and partly from the possibility of preserving these roots, and partly from the top becoming habituated to a more limited supply of food, the tree feels comparatively little the change consequent on transplantation.

Roots may be produced of a proper description for planting by the adoption of such means as the above, and if care be taken, they will suffer little from the operation of removal. Still they may be seriously injured from exposure to air, and more especially to drying winds, frost, and even to wet. To be covered in the soil is the natural condition of the roots of most vegetable productions, and therefore endeavours should be made to place them in such a condition with the least possible delay; or at all events, if circumstances render delay unavoidable, such means should be adopted as will preserve them in a state of moisture similar to that which they have in the soil. It is however necessary to observe, that when the tops are closely packed up and evaporation from them prevented, the roots should be kept rather dry than otherwise, for under such circumstances damp is found to be much more frequently destructive than a little dryness.

Though the preparatory steps to planting, as regards roots and their preservation, may be properly taken, yet, if the operation be not performed at the proper season, success will, not be complete. It is true that instances may be adduced of planting being done at the very opposite season to that which is here recommended as the best; but such cases are only examples of what may be done by extraordinary care in adopting artificial means so as to imitate more natural circumstances. It is a well known fact that plants are subject to a process of evaporation from all the parts which are exposed to the atmosphere, provided the latter is not in a state of saturation. The source from whence this evaporation is supplied is the moisture of the soil, and the roots are the media by which it is collected and transmitted to the stem, branches, and leaves. If the expenditure be greater than the supply of moisture, the plant will begin to suffer; if the disparity be great and continued, a degree of desiccation will be occasioned sufficient to deprive the vegetable tissue of that moisture which constitutes the medium of intercommunication between the different cells; organization is destroyed; the chain which connected it with vitality is broken, and incapable of being reunited by any mechanical means.

A much greater amount of evaporation takes place from a given surface in some species than in others; but the amount as regards plants of the same species, all other circumstances being the same, is in proportion to the extent of surface which the respective individuals possess. The leaves of a lime-tree may have a surface equal to thirty times that of the stem, branches, and twigs which produce them, and consequently the demand on the roots for the supply of evaporation will be thirty times greater when in leaf than when the branches are naked. Instances might be adduced in which this difference would even be exceeded; but if, on the contrary, it were found considerably less, still there would be sufficient evidence of the impropriety of moving plants when in leaf: and it may be here remarked, that young leaves admit of the fluids being more rapidly evaporated than old ones.

The month of December is that in which the condition of the air with regard to moisture approaches nearest to that of complete saturation, and next in this respect is January, which is also the coldest. It might therefore be concluded that these months are the best for planting, more especially as they are the most opposite in character to June and July, which, from their being the hottest and driest, are found to be the worst. But November is also moist; and although the temperature of the season has not then reached its minimum, yet the foliage, accustomed to exercise its functions under a summer heat, can no longer perform them under a reduction of temperature, which, though not the lowest, is comparatively low as regards summer productions. The leaves in consequence lose their connection with the roots; the earth still retains considerable warmth; and although the absence of leaves in deciduous trees, and perhaps the inactivity of those of evergreens, may prevent the formation of wood, except in the most limited degree, yet the buds, whilst they are themselves increased in volume, maintain a corresponding action in the roots, sufficient in many instances to form fresh spongioles before winter, a process which is favoured by the soil being warmer than the atmosphere. Should circumstances occur to prevent the actual protrusion of cellular substance in the form of spongioles, still an accumulation of it will be taking place, ready to burst forth in spring. On this account therefore, although December, January, and February are sufficiently moist, yet *November*, or *as soon as the leaves have fallen*, is the preferable season for planting. There may be some exceptions, as in the case of very wet soils, where the plants, if not firmly rooted, are liable to be thrown out during winter, owing to which spring planting would be more proper. But under ordinary circumstances all deciduous trees will succeed best at the period above indicated. Such species as push forth their buds early ought certainly to be planted in autumn. Many of the Coniferous tribe will succeed well if planted soon after they have made their summer's growth: the earth is then warm, and the plants make roots very promptly. Some species of this interesting order of trees require to be planted either before winter, so as to have sufficient time to strike root, or *immediately* before their buds begin to burst in the spring. These species of trees are injuriously affected by exposure to dry cold winds, even when their roots are undisturbed by removal; but if planted at a season when several months must elapse before any perfect action can commence, the tops are apt to become dried up in the interval. It appears that if their juices become inspissated to a certain extent, they never again become liquified, probably owing to their resinous nature.

The watering of newly planted trees ought to be attended to. The supply in the first instance should be copious, in order to wash the earth into the cavities among the roots. Some err in keeping the roots of newly planted trees constantly soaked with water, as if they were those of bog-plants, for which only such treatment is proper. In watering, consideration should always be had to the nature of the plant, to which, if it delight in dry soils, no more water should be artificially applied than is necessary to moisten it as much as the soil in which the species grows naturally, and at a time when shoots and leaves are abundantly produced. When watering is performed, it should be done thoroughly, so as to reach the lowest portions of the root. In the case of plants being much dried from long carriage or other causes, the supply on first planting should be very moderate. The tops however should be frequently syringed, in order to moisten the bark and prevent its absorbing the organisable matter which descends towards the root by the inner bark. The flow must be extremely weak under such circumstances; but if it can be preserved from the effects of drought till it reach the extremities of the roots, the formation of fresh spongioles will immediately commence, and the tree may then be pronounced out of danger.

The manner of performing the operation of planting may be reduced to one general principle, that of placing the roots in the soil so as to imitate as closely as possible the position which they occupy when growing wild and uncontrolled. Plants indeed may be instanced whose roots have been observed in one situation penetrating to the depth of four or five feet; or in another, creeping along the surface, amongst stones, or into the crevices of rocks, with scarcely soil to cover them, as for example in the vine. But although roots can usually accommodate themselves to that position which the nature of the situation renders it alone possible for them to occupy, yet there can be no doubt that in all cases the extremities of the roots should be lower than where they diverge from the stem, a rule which, however self-evident it may be, is frequently violated in practice by making a basin-shaped hole, deepest in the middle, in which the roots are either doubled or have their extremities tending upwards on the sloping sides of the cavity.

The excavation for the reception of the roots of a plant should be considerably larger than those roots will traverse when extended at the time of planting. It should be as wide at bottom as at top. The bottom should be more or less convex, and the depth such as to admit of the roots being covered to the extent observed in undisturbed seedling plants of the same species; that is to say, the upper part of the root should only be just covered. The lower roots should be regularly disposed over the convex bottom of the excavation, and carefully strewed with some of the finer portion of soil, over which the other roots may be spread. More soil should then be carefully rather than forcibly introduced. There should be no vacant spaces left, except those of so minute a description that they will be readily filled up by the finer particles of earth washed down by a plentiful watering. This watering should be given when the soil is nearly all filled in; and after the water has subsided so as not to stand above the surface, the latter should be covered with the remaining portion of soil. Except in very loose or light soils, this method will supersede the necessity of the hard beating and *treading in* to which the roots of trees are very generally subjected. The latter practice is now however being laid aside by many, from a conviction of its injurious effects. It is also necessary to remark that a plant should be placed, before the introduction of the soil, exactly as it is intended it should stand; and it should not be pulled from side to side for the purpose of shaking the earth amongst the roots. If the tree be drawn to one side, the fibres of the root will also be drawn towards the same side; but they are of course too flexible to force their way back when the tree is drawn in a contrary direction, and they must therefore become more or less doubled. Nor should the soil be thrown *against* the fibres whilst the roots are being covered; it should be made fine, and either shaken from the spade so as to fall perpendicularly among the roots, or scattered by a force impelling it in the direction of the fibres, which will be in general from the stem towards the extremities, or from the centre to the circumference.

The principles here stated are applicable to the planting of large as well as small trees, and in fact to any terrestrial species of plant. There are however many modifications in practice, some of which may be noticed as proper under certain circumstances, and others as only to be condemned under any circumstances whatever.

Small plants are very frequently inserted by the *dibber*, a cylindrical piece of wood, shod with iron and tapering to a point. This is thrust into the soil, and in the hole formed by this means the roots of the plant are introduced, and a portion of soil pressed towards them by a second stroke of the dibber. It is evident however that by this procedure the roots cannot be in the most natural position; they are in fact the very reverse of being spread out to the best advantage. In the case of very valuable species, the spade or planting-trowel is used in preference to the dibber. The latter has nothing to recommend it on the score of good principles in planting; the expedition with which it can be employed is all that can be said in its favour.

Besides the spade and dibber, various other implements are used in planting, such as the *diamond dibber*, a pointed plate of steel with a short iron handle; a *mattock*, used in stony soils; and some others, adopted according to circumstances. In all cases however where the spade can be used, it is undoubtedly the best instrument. If the soil be unfit for allowing the use of the spade, it should be rendered so previously; and if some time be lost and expense incurred by using it instead of smaller and more expeditious, but at the same more cramping implements as regards the roots, the difference will certainly be ultimately in favour of a proper disposition of the roots by means of the spade.

With regard to the preparation of the soil for plantations, it is found that trenching the ground is attended with profit where it is practised for the purpose of rearing wood for fuel and small timber. This mode of preparation ought likewise to be adopted where trees are intended to be planted for ornament or for shelter. It has not been generally attempted in the case of extensive plantations of heath or rugged mountain-land. It may however be affirmed without hesitation that great advantages would be derived from the operation being more extensively performed. Something more than merely burying the roots of hard-wooded plants is thought necessary, and accordingly *pits* are made. It is scarcely necessary to observe that if these are not of considerable size, the direct progress of the roots is soon obstructed. The time required to form these pits as they ought to be, would be sufficient to regularly trench double their area. The expense of trenching the intermediate spaces will be compensated by the greater return derived from the nurse plants, such as larch, when they come to be removed.

Plantations are generally planted thick in the first instance, and with various species of trees. Larch, Scotch fir or pine, mountain ash, &c. are interspersed amongst the hard wood for shelter, or as nurses. Laburnum is also useful for preserving the other sorts from the depredations of hares, as they prefer the laburnum to every other bark. Nurses are generally left till they are fit for various purposes for which small timber is applicable. They should be planted closer to each other than to the principal trees intended to constitute the more permanent part of the plantation.

After all the care of the planter and the skill with which the operation of removal may have been effected, much of the success of a plantation depends on the proper adaptation of species to the soils and situations most suitable to them. The following remarks upon some of the timber-trees principally cultivated may be useful.

The oak, *Quercus robur*, and *Q. sessiliflora*, prefers strong or even clayey loam; any soil not wet or chalky.

Beech, *Fagus sylvatica*, calcareous soils, gravelly or sandy loam; dislikes stiff clay.

Elm, *Ulmus campestris*, *U. glabra*, *U. montana*, attains, near the banks of rivers, a large size; thrives in most soils.

Ash, *Fraxinus excelsior*, affects a dry subsoil; dislikes a stiff clay.

Plane, *Platanus orientalis*, rich warm soil, tolerably moist, but not retentive.

Sycamore, *Acer Pseudo-Platanus*, *A. platanoides*, best in moist deep soil, but will thrive in others not too stiff; withstands the sea-breeze.

Chestnut, *Castanea vesca*, deep sandy loam.

Walnut, *Juglans regia*, deep loam with a pervious subsoil; dislikes strong clays.

Hickory, *Carya alba*, similar soil to that required by the preceding.

Acacia, or locust-tree, *Robinia pseud-Acacia*, sandy loam; a sheltered situation; cannot bear storms.

Birch, *Betula alba*, forms best timber on dry sandy or gravelly soil.

Laburnum, *Cytisus alpinus*, any soil not too wet.

White Beam, *Pyrus Aria*, any good soil, with a pervious subsoil; dislikes wet clay.

Lime, *Tilia Europæa*, soft deep loam, in low rather moist situations.

Horse-Chestnut, *Æsculus Hippocastanum*, deep loam; not in exposed situations.

Poplar, *Populus alba*, *P. canescens*, *P. nigra*, *P. tremula*, *P. fastigiata*, *P. Græca*, *P. monilifera*. These thrive in almost any soil, but best in that which is deep and rather moist.

Mountain-Ash, *Pyrus Aucuparia*, any soil, wet clay excepted; adapted for high situations.

Alder, *Alnus glutinosa*, moist or even swampy soil.

Willow, *Salix*, of numerous species. Some thrive in rather dry soil, but all prefer moist.

Pine, *Pinus sylvestris*, *P. Laricio*, *P. Pinaster*, *P. Strobus*. The two first are adapted for thin, rocky, gravelly soils; they grow at a great elevation on the warmest sides of mountains, but better in mountain glens; they dislike stiff clay and deep strong loam, and, like all coniferous plants, they do not thrive on chalk. *P. Pinaster* and *P. Strobus* require a less exposed situation than the other two.

Spruce, *Abies excelsa*, *A. alba*, *A. rubra*, *A. nigra*, deep moist soil, in low situations; dislikes thin sandy soil and exposure.

Larch, *Abies Larix*, adapted for thin mountain land, or any soil of which the subsoil is not retentive, excepting however red-sandstone or chalk, as above mentioned.

Cedar of Lebanon, *Abies Cedrus*, any tolerably good soil, rather deeper than for the larch, but a pervious subsoil, free from stagnant water.

Too close planting produces weak drawn-up timber, in consequence of the tops only receiving a due share of light. It is true that the most magnificent trees are found in those antient forests that have never been sown, planted, or thinned by the hand of man. But at the same time it will not be denied, that wherever natural forests exist, the soil and situation must be exceedingly favourable for the species produced; and that although thousands sprung up more than could possibly find room to attain perfection, yet those only that were the most favourably circumstanced and most vigorous would continue; and when once their tops got completely above those of the general mass, the latter must have inevitably fallen into decay. There is no reason however to suppose that those which maintained their ground, and, favoured by propitious soil, became lofty specimens, would not have been benefited by the assistance of the axe to relieve them sooner from their rivals.

If, on the contrary, trees are planted at too great a distance from each other, they are inclined to ramify into large limbs and spreading tops, with a stem short but much thicker than where the space admits of less expansion of foliage. If therefore very thick timber of no great length be required, wide planting is proper; but if tall timber be the object, the plantation must be moderately thick.

The care which plantations require from year to year consists in making up deficiencies, thinning, and pruning. Deficiencies seldom occur if the planting be at first duly performed; and every endeavour should be used to prevent the necessity of *making up*. This is always done with considerable disadvantage to the plants thus introduced, unless the spaces be trenched; but in that case, if the species of tree be properly chosen, the plants may do well in consequence of the shelter afforded by the older surrounding individuals.

Thinning should be commenced in due time. No branch of the temporary trees should by any means overhang the top or even branches of those that are permanent. The shelter on the most exposed sides of the plantation should be formed of robust, vigorous, growing kinds, and it should be allowed to remain unbroken. Plantations that have been neglected till they have formed a dense thicket, must be thinned gradually; for if thinned at once, those left would be injured by the sudden exposure, and would be blown over by winds.

Pruning is an important operation in the management of plantations, but it is often improperly practised tised for want of the knowledge of a few physiological facts, which are essentially necessary to be stated before any rules for pruning can be properly given. If these facts be understood, few rules will be required, but otherwise a volume of directions are liable to be misapplied. It ought therefore to be understood, that the sap ascends the stem chiefly through the alburnum or outer layers of young wood. It then enters the leaves, when it is exposed to the influence of light. Having in consequence undergone an elaboration, it descends on the outside of the alburnum, that is to say through the inner bark, the internal surface of the latter possessing a great degree of lubricity, whereby the passage of a portion of the juices at least is facilitated to the roots; whilst part is detained and becomes organised by the action of the medullary rays, forming a new layer of woody matter. The thickness of the layer so formed is very different in different species; but in the same species, all other circumstances being the same, it is in proportion to the surface of leaves. The aggregate horizontal growth, or in other words the diametrical extension of the stem, branch, and even roots, depends upon the quantity of healthy foliage. The diametrical increase of any particular part corresponds with the greater or less proportion of foliage above that part. Again, it may be stated that if one tree has a clear stem of 20 feet in length, and another has one of 40 feet, the roots and foliage of both being equal, the layer of new wood will be much thinner in the latter case than in the former; for the deposition of woody matter will have to extend over double the surface in the tall tree. It may be also remarked, that, in general, if a tree be left entirely to nature, it will ultimately produce a greater bulk of wood, taking stems and branches together, than would be the case if subjected to pruning. Except however in the case of growing for fuel, pruning is more or less necessary. The value of a timber tree depends chiefly on the stem, the branch timber being of less value. The object to be kept in view in pruning for timber is the production of a clean stem with as small a proportion of branches as possible. But it has been explained that the growth of the stem depends on the quantity of foliage, and without branches a sufficient quantity of foliage cannot be maintained. Whilst, on the one hand, an undue preponderance of branches is prevented by pruning, yet, on the other, as much foliage should be preserved as circumstances will permit.

An excessive privation of foliage should never be occasioned at any one time. It is therefore advisable that pruning should be commenced early, in order, as it were, to repress irregularities in the bud. At all events, whenever an irregularity can be clearly distinguished as such, it should be checked. Thus, when a shoot, occupying the position of a branch, ascends in competition with the top, or leading shoot, and is allowed to go on for years, the stem will have a forked character; or if the competing portion be amputated after it has acquired a large size, the timber will be rendered unsound. But if the shoot from which this aspiring limb took its rise had been stopped in the first or second season of its growth in summer, the tree might have been grown with a clean regularly tapering stem. It is only great irregularities however that should be meddled with during the early growth of the plant; otherwise the increase of roots is prevented, such increase being reciprocal with that of the branches.

Young shoots of the above description may be checked by being shortened in summer; but no large branches should be cut off at that season, nor after the sap begins to flow briskly in spring. Towards autumn however, when the leaves have nearly ceased to carry on their functions, pruning may be very properly performed; and some species, for example the birch and maple, require to be pruned at that time, otherwise they are apt to bleed. The period at which *bleeding*, that is, an extravasation of sap, takes place with greatest force, is immediately before the bursting of the buds in spring. If a branch be cut off when in foliage, the remaining portion draws the sap and prevents effusion at the wound. Some derangement will of course be produced in the flow of sap; and a diminution of the process of lignification and of the formation of roots will be occasioned, owing to the abstraction of a certain extent of foliage. But when the sap is in motion, and the leaves at the same time not expanded, the amputation of a branch is followed by a flow of sap, which appears to drain from every part of the tree. This sap becomes stale on exposure to the air; it then affects the cambium and inner bark, often to a considerable extent below the wound, and if these are not in all cases so far completely killed, yet they are generally more or less injured, and canker is apt to ensue.

Supposing it were required to rear a tree so as to have a stem of clean-grown timber, as tall and as thick as could possibly be obtained in any given time. The first consideration is the root, the plant being supposed to be young, with a top or upright leading shoot, and several side branches. All these should be left undisturbed in the first instance, unless such of the latter as may require a check if growing too strong for the others or for the leader. The laterals should be left, for the sake of the roots, till their presence on the stem becomes inconsistent with the object of producing it as free as possible from knots, taking also into consideration that the difficulty in healing the wound increases as the branches get older. A *few* of the largest shoots should be those first removed. They may be shortened in the first instance after midsummer, and afterwards cut off smoothly by the lowest circular wrinkles which form round their base, close to the stem, but without slicing off a portion of the bark; a slovenly practice, of which only bad pruners are guilty, and which can only have the effect of diminishing the power of the bark to close over the wound necessarily made by the pruning-knife. Such unnecessary wounds cause an extravasation of sap, as may be seen especially in coniferous trees, where they are generally covered with resinous exudations. In the following season the next largest branches should be in like manner displaced, care being still taken, on account of the importance of the foliage, as already explained, that the quantity removed shall be no more than is absolutely necessary.

Small branches along the stem should be left till they approach the dimensions by which the removal of the others is regulated. These principles should be followed up till the required height of stem is attained; after which the branches composing the top should be allowed full freedom, in order to increase, by their organising power, the diameter of the stem.

Coniferous trees require little pruning; nor is it necessary to commence so early with them as in the case of other kinds. In dense forests they are found with straight stems approaching the height of 100 feet clear of side branches, the latter gradually decaying below as they become excluded from light and moisture by those above them. When from this cause the lower branches of coniferous trees are observed to lose in a great measure their vigour, and when their foliage contributes little to the enlargement of the stem, they may then be very properly cut off, without waiting for their actual decay. It is a question whether the branches of these trees should be cut close to the stem at once, in pruning; or whether they should first be *snagged*, that is, cut at some distance from the stem, and either allowed so to remain or be afterwards cut close. That plan is best to adopt by which the least exudation of resinous substance is occasioned, and the blemish soonest overgrown. With the view of preventing the former, the branch may be shortened only to the first live twigs, so as almost to nullify its connection with the stem, preparatory to its final and close removal in the following season.

By choosing the proper season, and by previous shortening, large limbs of any healthy tree may be closely amputated so as to heal over without affecting the tree generally, or even the portion of stem more immediately connected with the limb to any material extent; yet the new layer of wood will prove, on cutting up the timber, to be only in close contact with the surface of the wound, which will remain dead, and with which the living matter enclosing it could not coalesce. A piece of unsound wood is thus embodied. In this case it would be advisable to shorten the limb to such of its laterals as will just be sufficient to keep it alive till the tree is felled. If, in the interval, the branch should push vigorously, means must be adopted to keep it always in a reduced state, by merely allowing as much foliage as will keep the branch alive, without affording any material addition to its diameter.

The proper season for felling trees is when the sap is most at rest. The operation ought not to be performed at any other time, unless for fire-wood. The quantity of sap that may be drawn from some trees is very great. This sap contains the elements of fermentation, the powerful effects of which are evident even on the strong fibre of the oak. Softer woods, although very tough if cut at the proper season, have been observed to crumble to powder in a year or two, in consequence of having been cut when in sap.

With reference to this subject, Miller in his 'Gardeners' Dictionary' (1768), has the following remark: 'Before I quit this subject, I must beg leave to take notice of another great evil, which is of so much consequence to the public as to deserve their utmost attention; which is, that of cutting down the oaks in the spring of the year, at the time the sap is flowing. This is done for the sake of the bark, which will then easily peel off; and for the sake of this, I think there is a law, whereby people are obliged to cut down their timber at this season. But by so doing the timber is not half so durable as that which is fallen in the winter, so that those ships which have been built of this spring-cut timber have decayed more in seven or eight years than others which were built with timber cut in winter have done in twenty or thirty; and this our neighbours the French have experienced, and therefore have wisely ordered that the bark should be taken off the trees standing, at the proper time, but the trees left till the next and sometimes until the second winter before they are cut down; and the timber of these is found to be more durable and better for use than that of any trees which have not been peeled. Therefore I wish we were wise enough to copy after them in those things that are for public good.'

It may be observed, that at the time Miller wrote, the celebrated physiologist Duhamel was inspector-general of marine in France, and had been most probably the means of pointing out the evil, and proposing the remedy above referred to. This plan of barking in the spring and felling in the succeeding autumn is however by no means unobjectionable, and on some accounts is decidedly inferior to felling in autumn or very early in winter without previous disbarking.

(Sang's *Planter's Kalendar*; Loudon's *Arboretum Britannicum*; *Encyclopædia of Gardening*.)

PLANU'DES, MAXIMUS, a Byzantine monk, born, as he himself in one of his works says, at Nicomedia. The time of his birth is unknown, and almost the only circumstance of his life which is beyond doubt is that in the year 1327 he was sent on an embassy to Venice by the emperor Andronicus the elder. At this time he must have been of a mature age. That he was still alive in 1340 is evident from a letter still extant, which he wrote to the emperor Joannes Palæologus, who ascended the throne in that year. D'Orville places his death in the year 1353, for which however he adduces no testimony. Gerhard Vossius prolongs his life to the year 1370; and others still later. Towards the close of his life Planudes is said to have been imprisoned on account of his partiality for the doctrines of the church of Rome; and when afterwards compelled to write against that church, to have done so in such a manner and with such feeble arguments that Cardinal Bessarion declared that the heart of Planudes had no share in what he had written on that occasion.

We are indebted to Planudes for the preservation of a number of valuable Greek poems. He made a collection of Greek epigrams, in seven books, extracted from the comprehensive Anthology, in fifteen books, which Constantinus Cephalas had compiled in the tenth century. Planudes, in his collection, omitted those poems which seemed to him obscene or of little importance. This collection, though the compiler had displayed little taste or discernment, was, at the time of the revival of letters in Italy, the only one which was known, and was first printed, in 1494, at Florence, by John Lascaris. This edition was reprinted at Venice in 1503, and at Florence in 1519. A better edition, and with some additional poems, was published by H. Stephanus, at Paris, in 1566, which was likewise reprinted several times. It has been translated into Latin by Grotius. In 1606, Salmasius discovered, in the Palatine library at Heidelberg, a MS. belonging to the tenth century, which contained the complete Anthology of Constantinus Cephalas, upon which our present 'Anthologia Græca,' revised by Brunck, and edited by Fr. Jacobs, is based. Planudes also made a collection of fables, ascribed to Æsop, to which he prefixed a Life of the father of fabulists, which is full of absurdities. Some of the fables which are attributed to Æsop by good and antient authorities are not found in this collection, whereas others which cannot possibly belong to him are incorporated in it. There are two MSS. of this collection of fables, one of which is in the king's library at Paris. [Æsop.] Planudes also made a translation of the 'Metamorphoses' of Ovid into Greek prose, which was edited, in 1822, by Boissonade; also a Greek translation of Cæsar's 'Gallic War,' which was printed by Jungermann in his edition of Cæsar, Frankf., 1606; but it is a disputed point whether this is the translation of Planudes. Most of his other translations, such as that of some works of St. Augustin, and Macrobius on the Dream of Scipio, as well as his numerous original works, partly on theological, partly on scientific, and partly on grammatical and rhetorical subjects, have never been thought worth being published, and are scattered in various libraries. His literary character on the whole is low; he wanted perseverance and honesty, and was guilty of several forgeries, especially in his 'Anthology,' his 'Life of Æsop,' and the collection of fables ascribed to him.

PLANULA'CEA, M. de Blainville's name for his second family of the *Cellulacea*, Bl., containing the genera *Renulina* and *Peneroplis*. [Foraminifera, vol. x., pp. 347, 348.]

PLANULA'RIA, Defrance's name for a genus of microscopic *Foraminifera*. [Foraminifera, vol. x., p. 347.]

PLANULI'NA, M. D'Orbigny's name for a genus of microscopic *Foraminifera*. [Foraminifera, vol. x., p. 348.]

PLANULI'TES, Lam. (*Discorbis* or *Discorbites* of the same author), a genus of microscopic *Foraminifera*. [Foraminifera, vol. x., p. 348.]

PLASTIC CLAY. The lower part of the Tertiary series of England and France yields, with green-sands and pebbles, beds of red, white, or mottled clay, often of excellent quality for the potter. The series of beds related to these clays and sands has received the name of plastic-clay formation, but, by a large view of its geological and zoological characters, it may be ranked in the same group as the London clay, and thus be contained in the Eocene deposits of Lyell.

PLATA, RIO DE LA, is a large river in South America, or rather this term is only applied to the wide æstuary formed by the confluence of the rivers Paraná and Uraguay. Where this river enters the sea, between Punta del Este and Cape S. Antonio, its width is not less than 120 miles; and between Punta de las Pedras and the Barrancas de Santa Lucia above Monte Video, it is still 53 miles wide; but above these places the shores gradually approach nearer, and opposite Colonia they are hardly 20 miles apart. The æstuary continues to preserve this width to the confluence of the two large rivers which fall into it. This æstuary is very shallow. At its mouth it is only ten fathoms deep on an average, and this depth gradually decreases. Opposite Monte Video the average depth is not more than three fathoms; and this may be considered the average depth of the La Plata to Buenos Ayres; so that vessels drawing more than 16 feet of water cannot run up farther than that town. The deep part of the river opposite Buenos Ayres is from seven to eight miles from that town: this part is called the outer roads, and between them and the inner roads there is a sand-bank. Smaller vessels anchor in the latter at from one to two miles from the shore. The navigation of this æstuary is very difficult, owing to the very dangerous shoals, the strong and irregular currents, and the sudden tempests to which it is subject. Between Monte Video and Buenos Ayres there are four banks, Lara Bank, Santiago Bank, Ortiz Bank, and Chico Bank, of which the third is very extensive. When the river is low, there are only from seven to nine feet of water on them. The currents are extremely irregular and strong, a circumstance easily accounted for, when it is considered that the larger of the two tributaries, the Paraná, rises within the tropics and during the rainy season brings down an immense volume of water, and that the wide expanse of the æstuary, being bounded either by low and level or very slightly elevated ground, is subject to be influenced by every strong wind which drives a great volume of water to the point of the compass opposite to that from which it blows. The effect produced in this respect by the pamperos, or south-western gales, which frequently blow with inconceivable fury, is very great. Singular fluctuations in the depth of the water occur before and after these pamperos. For some days before them the river rises, and is always higher than usual when the south-west wind begins; but after a few hours the water falls rapidly, and vessels are left aground. Instances are known of the upper part of the æstuary, opposite Buenos Ayres, having been so much affected by strong south-westerly or westerly winds, that men have ridden several miles into its bed to places where ships usually anchor: accordingly, it is not unusual for the water to fall in the outer road of Buenos Ayres, in less than twelve hours, from six to two fathoms in places where the usual depth is four fathoms. All these circumstances must render the navigation of this æstuary extremely difficult and dangerous, and hence it is called El Infierno de los Marineros; but Captain Fitzroy enumerates its redeeming qualities also in having anchoring-ground everywhere, and soundings where the indications are certain if the vessel is approaching danger, as the bottom is hard on and near the banks, while in the deeper water it is very soft. Little or no tide has been hitherto noticed in this wide expanse of water, but Captain Fitzroy thinks that 'this anomaly may be more apparent than real; for where the depth of water is so fluctuating and the currents are so variable, it is difficult to distinguish the precise effect of tides, except by a series of observations far longer than has yet been made.'

Through this æstuary the commercial produce of about one-fourth of South America is brought to the market of the world. It is therefore a great advantage to the countries from which the æstuary of the Plata receives its waters, that the rivers which flow into it offer less obstruction to navigation than is usual in large streams. The largest of these rivers, the Paraná, is navigable for vessels of 300 tons as far as the island of Apipé, situated between the state of Corrientes and Paraguay, where the river runs westward, a distance of about 750 miles from its mouth. The Rio Paraguay, the largest affluent of the Paraná, may be navigated by large boats nearly to its source, at least to 16° N. lat., which is more than 800 miles above its confluence with the Paraná, in a straight line, and perhaps not less than 1200 miles measured along the bends of the river. The Rio Pilcomayo is too shallow for navigation, but the Rio Vermejo, another affluent of the Paraguay, is navigable from its mouth upwards to the confluence of its two principal branches, the Lavayen and Rio de Tarija below Oran, a distance of more than 400 miles above its confluence with the Paraguay. The Salado, which joins the Paraná in its lower course, is navigable to the town of Matara, which is at least 350 miles from the mouth of the river. The Uraguay, another large river which falls into the La Plata, is less suitable to navigation, as two cataracts occur about 180 miles above its mouth, which cannot be passed, except when the water is at its highest level.

(*Surveying Voyages of the Adventure and Beagle;* Parish's *Buenos Ayres, and the Provinces of the Rio de la Plata;* and Ignacio Nuñez, *Account of the United Provinces of the Rio de la Plata.*)

PLATA, LA. *The Provinces of the Rio de la Plata*, also called the *Argentine Republic* (*Republica Argentina*), comprehend a large part of the surface of South America. The river Cusu Leubu, or Rio Negro, has lately been fixed as their southern boundary: the mouth of this river is near 41° S. lat. On the north, where the republic borders on Bolivia, the parallel of 22° S. lat. chiefly constitutes the boundary-line. Thus the country extends from 41° to 22° S. lat., a distance of 1320 miles in a straight line. On the west, the highest part of the Andes divides it from Chile and the Bolivian province of Atacama; and on the east it is separated from Paraguay by the course of the Rio Paraguay, and from Brazil and Banda Oriental (Uraguay) by the Rio Uraguay. On the east, the boundary-line lies near 58° W. long., except a comparatively narrow tract, which projects between the Paraná and Uraguay as far as 54° W. long. On the west the boundary-line, south of 30° S. lat., is near 70° W. long.; but farther north it declines to the east, and at the north-western corner of the country it coincides with 68° W. long. The average width is about 620 miles. The whole surface is calculated to be 726,000 square miles, or nearly three times and a half the extent of France, and nearly six times and a half that of the British Islands.

Surface and Soil.—About one-sixth of the surface of this country is mountainous: the remainder consists of wide plains, on which are scattered a few isolated ranges of hills, and an extensive system of low mountains, called the Sierra de Cordova.

I. *Mountains, and Countries enclosed by them.*—The mountainous countries lie on and along the eastern declivity of the Andes. This mountain-range, which traverses South America in all its length, from the Strait of Magalhaens to the Isthmus of Panama and the neighbourhood of the Caribbean Sea, is of comparatively moderate width south of 30° S. lat., hardly exceeding anywhere 100 or 120 miles; but north of that parallel the eastern side spreads out into an extensive mountain-region, the eastern border of which is more than 400 miles distant from the western declivity of the range.

The Andes from 40° S. lat., where they begin to constitute the western boundary of the Argentine Republic, dividing it from Chile, to 37° S. lat., are very little known. They seem to be composed of two parallel ranges, about 30 or 40 miles distant from each other, of which the western is supposed to be the more elevated. A considerable part of the western range rises above the snow-line, which in these parts occurs about 10,000 feet above the sea-level, and among its summits there are three volcanoes. The most southern, the Volcano de Villa Rica, or Cerro Imperial (39° 10′ S. lat.), attains an elevation of more than 16,000 feet, the sides, to a great distance below the summit, being always covered with snow. Farther north is the Volcano de Cura (38° S. lat.). These two volcanoes are in the western range. In the eastern is the Volcano de Unalavquen (37° 10′ S. lat.).

Farther north, between 37° and 34° S. lat., it is known that the Andes consist of two parallel ranges, which in some places approach one another within 30 or 40 miles, and at others are 70 or 80 miles apart. The eastern range is imperfectly known, but does not attain such an elevation as the western, no part of it apparently being covered with perpetual snow, except between 36° and 35° S. lat., where a Cerro Nevado is marked on Parish's map. This range is known to contain one volcano, that of Pomahuida (near 36° 15′), which had three eruptions between 1820 and 1830, and a terrible one in 1822. In the western range, which in its whole extent forms the watershed between the rivers that run to the Pacific and Atlantic oceans, and is therefore considered as the boundary between Chile and the Argentine Republic, many summits rise far above the snow-line, and four among them are volcanoes, the Volcanoes de Antuco (36° 50′ S. lat.), de Chillan (36° 5′ S. lat.), de Peteroa, or Curico (35° S. lat.), and de Rancagua (34° 10′). A much greater number of volcanoes is marked on our maps, but it has not been ascertained that they really are volcanoes. The general elevation of this portion of the Andes may be from 12,000 to 13,000 feet above the sea, and consequently it approaches the snow-line, as is shown by the mountain-passes by which this part of the Andes is traversed. The most southern of these passes, that of Antuco, near the volcano of that name, rises in its highest part above the line of vegetation. The Planchon pass (about 35° 10′ S. lat.) is much lower, as there is vegetation upon it; and it probably does not exceed 11,000 feet. The third pass, called Il Passo de las Damas, occurs near 34° 50′, and as it is clothed with vegetation even at its most elevated point, it is supposed not to rise above 11,000 feet.

Between 34° and 33° S. lat., the two ranges of the Andes are not far distant from each other, and they enclose the elevated valley of Tunuyan, which is about twenty miles wide, and 7500 feet above the sea-level. The ranges, which run nearly north and south on each side of the valley, attain nearly double that elevation. The pass called Portillo, which traverses the valley obliquely, rises on the western chain of the Andes to 13,210 feet, and on the eastern to to 14,365 feet. This pass is only open from the beginning of January to the end of April, being blocked up by snow the remainder of the year. South of this pass is the Volcano de Maypu, or Peuquenes, which is above 15,000 feet high, and always covered with snow.

Between 33° and 30° S. lat., the two ranges of the Andes recede from one another to the distance of forty or fifty miles. Between these ranges is the valley of Uspallata, which is about 180 miles long and 40 miles wide, of which width about 15 miles are level ground, and the remainder consists of hills, which skirt both ranges. The level part of the valley is 6200 feet above the sea-level. Near 32° S. lat. the valley is traversed by some higher ground, which runs east and west, and from which the Rio de Mendoza runs southward, and the Rio de S. Juan northward. The former stream finds its way to the eastern plains by a cleft in the mountains near 33° S. lat., and the second by a similar passage near 31°. The soil of the valley is sterile, and impregnated with salt, except towards the northern extremity, where it is fertile. The range of the Andes which is east of the valley is called the Paramilla Mountains: it is about 10,000 feet high, and is partly covered with wood. The great chain of the Andes, west of the valley of Uspallata, occupies between 50 and 60 miles in width, and consists of four or five parallel masses of rocks, divided from one another by ravines or glens. The highest summits of these rocky masses may attain the elevation of nearly 14,000 or 15,000 feet, as there is snow in the ravines even in April. The road which leads over them, and in the highest part is called La Cumbre, attains an elevation of 12,454 feet, and is passable by mules from the commencement of November to the end of May, but the remainder of the year it can only be travelled by foot-passengers, and with considerable danger, being then blocked up by snow. On the northern side of the road is the Volcano de Aconcagua, the highest of the known volcanoes on the globe, rising 23,200 feet above the sea-level: it is within the boundary of the Argentine Republic.

North of 30° S. lat. the Andes assume a different character. As far north as 28° S. lat. they consist of three parallel but unconnected ranges. The western range forms one continuous mass of mountains with those which lie farther south and north, but the central and eastern ranges rise rather abruptly from the plains along the eastern side of the Andes near 30° S. lat., and they terminate as abruptly near 28° S. lat. The three ranges, together with the wide intervening valleys, occupy a space of more than 120 miles in width. The western range, which alone is called the Andes, does not rise above the snow-line. No volcano occurs in this mountain-mass; and indeed no volcano is ascertained as occurring between the volcano of Aconcagua (32° 13′ S. lat.) and that of Atacama (21° 36′). The Andes in this part not being so high as they are farther south, several easy passes lead over them, but they are only used occasionally, the country along the Pacific being nearly a desert. The central range is called Sierra Famatina, from the celebrated silver-mines which are found on its eastern declivity. South of 29° S. lat. the Famatina Mountains rise to a considerable elevation, though short of the snow-line; but north of 29° S. lat. there is an enormous mass of rocks, the summit of which, being covered with perpetual snow, is called the Cerro Nevado. On the eastern declivity of this mountain-mass are the mines. The eastern range of the mountains, called Sierra Velasco, preserves nearly an equal elevation in its whole extent, and its height probably falls short of 8000 feet, as it is rarely covered with snow even in winter. It is only about 3000 feet above the valley of Famatina. The valley which lies between the Andes and the Sierra Famatina is called the Vale of Guandacol: it is about 140 miles long, and 24 miles wide. A river, called the Bermejo, rises at the most northern extremity of the valley, and traverses it in a southern direction, until it reaches a point south of 30°, when it runs round the southern extremity of the Sierra Famatina, and entering the plain is either lost in the sandy surface of that tract or finds its way to the lakes of Guanacache. The valley of Guandacol is stated to be very favourable to the growth of wheat. There are some rich copper-mines, which are not much worked, because of the difficulty of bringing the metal to a market. The inhabitants are aborigines, who do not speak the Quichua language, and who partly live on the vicuña, whose skins supply an article of exportation to other provinces, where ponchos (cloaks) and hats are made of them. They have orchards, and cultivate small patches of ground. The valley of Famatina, which is enclosed by the Sierra Famatina and Sierra Velasco, is about the same length, but somewhat narrower, being hardly 20 miles wide. No stream runs through it. The southern half is a complete desert without water. The soil is sandy, and in many places covered with salt. In the neighbourhood of the Cerro Nevado, the rills of water which descend from the mountains form small rivers, which run to the plains, and supply the means of irrigation. As the soil of these parts is clayey and retentive of moisture, many tracts of moderate extent are cultivated, and produce Indian corn, peas, and trefoil clover, and several culinary plants, as artichokes, cauliflowers and cabbages, and excellent pumpkins. The hamlets are surrounded by vines, fig, peach, and orange-trees. The potato is indigenous in the Famatina mountains. From 6000 to 8000 barrels of wine are annually exported from this valley to Rioja, and thence to the other provinces of the republic. The climate of this valley is rather hot in summer; from December to February the thermometer in the hottest part of the day varies between 80° and 106°, and in winter (June and July) it probably does not descend below 50°, as no snow falls on the Sierra Velasco, which is 3000 feet above the valley. Heavy rain is uncommon, but snow is frequent, and at all seasons, on the Sierra Famatina. Thunder-storms also are common, and accompanied by very large hailstones. In winter, a wind from the north, called *sonda*, sometimes blows with great force, and produces the effect of a sirocco; it raises the thermometer to 90°.

North of 28° S. lat., the Andes cover an immense extent of country east of the high range which runs parallel to the Pacific. The south-eastern edge of this mountain-region follows a line beginning at the northern extremity of the Sierra Velasco, and running in a north-eastern direction to a place on the Rio Vermejo, about fifty miles below the confluence of the two rivers Lavayen and Rio de Tarija, its two principal branches. Between 24° and 21° S. lat., the eastern border is near 62° W. long. The northern part of the mountain-region is without the countries that belong to the Argentine Republic, and included in Bolivia, where the snow-capped Alturas de Lipez form its northern border. The descent of the Andes towards the Pacific terminates it on the west. The highest part of this extensive region, which lies between 65° and 68° W. long., and between 25° and 22° N. lat., is very properly called El Despoblado, or the uninhabited country. Its elevation has not been determined, but it is very probable that it rather exceeds than falls short of 13,000 feet above the sea. This elevation may be inferred from the total want of every kind of cultivation; even the quinoa appears not to succeed. It is however scantily covered with grass, on which numerous herds of alpacas and vicuñas find pasture, and chinchillas subsist. These animals, with a small quantity of gold collected in some rivers, and salt, which covers a large part of the surface, supply to the few Indian families dispersed over this inhospitable region the scanty means of subsistence. They also bring snow from the mountains to the towns in the valleys farther east. The surface of this tract presents no great variety of level, and is crossed by a road which leads from the town of Salta to Atacama in Bolivia. Though the whole region rises to so great an elevation, no part of it is covered with perpetual snow. Even the chain of the Andes, which constitutes its western border, does not contain one single summit which rises considerably above the general elevation of the whole mass.

The countries which surround the Despoblado on the south and east vary greatly in their level. From the southern border of the Despoblado, between 67° and 68° W. long., a range branches off, which runs south-south-east, and is called Sierra Ambato and Sierra Ancasta. It terminates north of 28° S. lat., nearly in the parallel of the northern extremity of the Sierra Velasco, but about one hundred miles east of it. The country between this lateral range and the principal range of the Andes is traversed by another chain in all its length, which however does not appear to rise to such an elevation as the Sierra Ambato. The valleys which lie between those chains are very imperfectly known, but their climate is described as hot and sultry, and this is apparent from the staple articles consisting of very good cotton and red pepper. The inhabitants cultivate wheat, and have herds of cattle, which find good pasture on the adjacent mountains.

From the eastern declivity of the Sierra Ambato, near 26° 45′, the Sierra de Aconquija extends in an east-north-east direction to the Rio Salado, on the banks of which it terminates at a point called El Passage (near 23° S. lat.), where the river runs southward. This range is very high in the vicinity of the Sierra Ambato, where a portion of it is always covered with snow; but farther east it sinks much lower, though it perhaps never falls below 10,000 feet above the sea-level. Opposite its eastern extremity, and on the left bank of the Rio Salado, there begins another range, which may be considered its continuation, as it runs in the same direction, and preserves the same general elevation. This range, which is called Sierra Lumbre, or Santa Barbara, terminates in some hills on the banks of the Rio Vermejo, several miles below the confluence of its two principal branches, the Rio Lavayen and the Rio de Tarija. A third range branches off from the eastern border of the Despoblado, near 22° 40′ S. lat.: it has at first the form of an elevated and wide range, and is called Abra de Cortaderas. Farther east it forms a table-land of great extent, called the Table-land of Yavi. Neither the range nor the table-land rises above the snow-line, but their general level can hardly be less than 12,000 feet above the sea, as both rise above the line of trees. The table-land, though a complete level, is destitute even of bushes, and severe frost is experienced on it in the month of June. It is only inhabited by guanacoes and vicuñas: it terminates with a steep descent on the Rio de Tarija, near 22° S. lat.

The countries enclosed between the eastern border of the Despoblado and the Abra de Cortaderas and the Table-land of Yavi on the north, and the Sierra de Aconquija and Lumbre on the south-east, consist chiefly of high table-lands. This elevated mountain-region is furrowed by a few deep, wide, and very long valleys, which, being much depressed below the general level of the region, are comparatively well-cultivated and populous. The longest of these valleys is that which is watered by the Rio Guachipas or the upper course of the Rio Salto. It begins at its upper extremity, on a depression of the Despoblado itself, near the small town of Acay, in the vicinity of which are some silver-mines, and it extends nearly a hundred miles southward, when it meets the Sierra de Aconquija, and the valley and the river turn to the north-east by east. Near the Despoblado the vale is too high to be fit for agriculture, and in these parts it is very narrow. But before it turns to the north-east it widens considerably, and the cultivation of the European cerealia begins. Large quantities of maize and wheat are grown, and the quantity of these articles exported to the other valleys is considerable. The rich pastures on the adjacent mountains support great numbers of cattle, horses, and mules. There are also extensive plantations of European trees, and much common wine is made, which finds a ready sale in the neighbouring districts.

The Vale of the Rio Guachipas terminates in the Plain of Salta, which extends about twenty miles in every direction. Another valley runs northward from this plain to the Abra de Cortaderas, a distance of about 150 miles. Through this valley lies the road which leads from Salta to Potosi, and it has excited the admiration of all travellers on account of its great length, its comparatively small width, and the steepness with which the rocks rise on both sides. In many places the valley is hardly a furlong wide. This valley may be called the Valley of Jujuy, as the town of that name is situated nearly at equal distances from both extremities of it. The wide valley of the Rio Lavayen, or Rio de Jujuy, branches off from the Valley of Jujuy, and extends more than 100 miles between the Sierra Lumbre and an elevated table-land to the north of it. It is much wider than the Valley of Jujuy, and the settlements are much more numerous here than in the other valleys. In these valleys tropical vegetation appears in all its luxuriance. Forests of large trees cover the banks of the rivers and ascend the hills to a considerable elevation. Besides maize, large quantities of sugar-cane are grown and exported. In the lower parts the coca (*Erythroxylon Coca*) grows, whose leaves are chewed by the natives, and the maté, or Paraguay tea-plant, is indigenous.

Along the south-eastern declivity of the Sierra de Aconquija and Sierra Lumbre there is a tract of considerable width, called the Plain of Tucuman, which is very fertile, and has a pleasant and healthy climate. The surface is furrowed by numerous small rivers, which originate on the declivity and at the foot of the ranges, and descend in a south-eastern direction to the lower country, which is farther east. This region is an inclined plain, which sinks to the south-east with an almost imperceptible slope. Having a hot but dry and healthy climate, and abundance of water for irrigation, it is the most fertile tract of the Argentine Republic, and is thence called the Garden of the Rio de la Plata. Its width south of the Rio Salado exceeds 70 miles, but between that river and the Rio Vermejo it is much less. The population of this plain, which is very great, is mostly occupied in raising corn, rice, maize, and tobacco. Much tobacco is exported. The sugar-cane is said to grow naturally in the low lands. The base and slope of the mountains are covered with tall trees, and supply pasture for cattle.

II. *Plains.*—The plains occupy about five-sixths of the surface of the provinces of La Plata. The most northern part of them, which is known under the name of El Gran Chaco, extends on the east of the mountain-region as far as the banks of the Rio Paraguay, and from the northern boundary of the republic to the confluence of the Rio Salado with the Parana, occupying all the tract between these rivers. This immense country, which is about one-sixth of the whole Argentine Republic, or 120,000 square miles, is very little known, there being only a few families, and those mostly of Indian origin, settled on the banks of the rivers. The interior is possessed by several aboriginal tribes, who wander about in the woods, and live on the produce of the chace and wild fruits. The most northern part of the desert appears to have annual rains, and the country is accordingly pretty well wooded. In this part, which lies between the Rio Vermejo and the Rio Paraguay on both sides of the Rio Pilcomayo, and which is called the Llanos de Manso, there is a considerable number of independent tribes, though the several families are generally small. The southern portion of the Gran Chaco, between 26° and 30° S. lat., is a complete desert for want of rain and water. The general character of the soil is sandy, and in many places it is covered with incrustations of salt; in others it is interspersed with small salt-swamps. No part of it produces grass, but some tracts are covered with stunted prickly trees. It is uninhabited, except on the banks of the Rio Salado, where a few families have settled.

The country which lies west of the southern portion of the Chaco, and extends to the banks of the Rio Dulce, though not considered as forming a part of it, does not materially differ from it in features, soil, and vegetation, except along the banks of the Rio Dulce, the water of which, being sweet, can be used for irrigation, and is in many places used for that purpose.

West of the Rio Dulce and between 28° 30′ and 30° S. lat., a desert extends as far west as the neighbourhood of the Sierra Velasco, from which it is separated by a fertile tract, called La Costa, hardly 20 miles wide. Where the desert is traversed by the road between Cordova and Santiago del Estero, near its eastern extremity, it is about 60 miles wide, but farther west it grows much wider. The surface is level, here and there interspersed with hillocks; for the most part covered with a thick salt efflorescence. Hence the desert has obtained the name of Great Salina. The vegetation is limited to a kind of salsola, from the ashes of which soda is extracted. This desert is probably the hottest part of America, the heat during the prevalence of the northern winds in summer being almost insupportable in those places which are built on the borders of this desert, as Santiago del Estero. This may be mainly attributed to the nature of the soil, but partly to the lowness of the country, it having been ascertained, by barometrical observations, that the surface of the desert is only a few feet above the level of the sea at the town of Buenos Ayres, though it is 700 miles distant from that point.

That part of the plain which lies between 30° and 33° S. lat. exhibits a different character. Nearly in the middle of it is the Sierra de Cordova, a system of heights, which in another place would be called mountains, but in the neighbourhood of the snow-capped Andes can only be called hills. It was formerly supposed that this sierra was connected with the Andes, but it has been ascertained that a plain 200 miles wide lies between them. The more elevated and mountainous part of this system is between 30° and 32° S. lat., and extends more than 120 miles from north to south, but the width does not exceed 50 miles. The southern part, between 31° and 32°, is a small table-land, about 30 miles wide, and growing narrower towards the south. The declivity is gentle towards the base, but near the top it is steep. The plain is covered with grass, but is entirely devoid of trees. It may be about 2500 or 3000 feet elevated above its base, and perhaps 3500 or 4000 feet above the sea-level. In winter it is sprinkled with patches of snow. The short valleys, by which the western side is furrowed, produce abundance of maize and fruits, and this is also the case with the long valley, which runs along the eastern unbroken declivity. Near 32° S. lat. the table-land branches off into two ridges, of which the eastern is called the Sierra and the western the Serrazuela. They run north and north-westerly, and at their northern extremity are more than 50 miles from each other. The intervening country is a succession of stony or sandy ridges flat at the top, and alternating with broad pastoral valleys interspersed with plantations of fig and peach trees.

The country which extends from the Sierra de Cordova to the Rio Paraná is hilly, or strongly undulating along the base of the heights, and produces good crops of Indian corn in the lower tracts where the fields can be irrigated. This hilly country extends about thirty miles, when the country sinks into somewhat irregular plains. Some parts of these plains are covered with trees, but others are without wood, which becomes more scarce as we proceed farther east, until the woods re-appear at some distance from the banks of the Paraná. These woods chiefly consist of low mimosas or stunted prickly trees. The plains are generally covered with coarse grass, but in some parts, especially in the eastern districts, the soil is impregnated with salt. The numerous small streams which flow from the eastern declivity of the Sierra de Cordova, and unite into three rivers, the Primero, Segundo, and Tercero, do not join the Paraná, but are lost in small salt lakes, with the exception of the Tercero, which however, in the dry season, is very shallow, and has hardly water enough for small boats. The Rio Dulce, a large river which rises in the Sierra de Aconquija, and runs about 400 miles, is likewise lost in an extensive salt lake, called Laguna Salados de los Porongos. The salt lakes in which these rivers are lost occur between 30° and 32°, and are near the meridian of 62° W. It seems that a deep depression runs along this meridian, and that the country between it and the Rio Paraná and Rio Salado is much more elevated. There are agricultural settlements in this country on the banks of the rivers, and small hamlets, inhabited by herdsmen, occur on the plains. Though the pasture is indifferent, a considerable number of cattle are reared. The country which surrounds the southern extremity of the Sierra de Cordova, and extends to 33° S. lat., resembles in its general character that which is to the east of it, except that it is traversed in several places by narrow ridges of low rocky hills, along the bases of which vegetation is much more vigorous, and the soil more favourable to agriculture than in the wide plains which lie between them.

The country which lies on the west of the Sierra de Cordova, and extends in that direction for 120 or 130 miles from the range, is nearly altogether bare of grass. Rain is scarce in all the countries of South America south of 24°, and this want of moisture is the chief reason why cultivation extends so slowly in these parts. In the country west of the Sierra of Cordova it never rains, nor is the ground ever refreshed by dew, which falls abundantly in the pampas farther to the south-east. The soil of this region is composed of a loose and friable clayey loam, and the greater part of it contains stunted trees; tracts covered with salt incrustations, or with grass, are only occasionally met with, and never occupy a large surface. The grassy tracts are most numerous near the southern extremity of the Sierra Velasco, where they are called Los Llanos, and supply pasture for numerous herds of cattle.

That part of the plain which extends from 33° S. lat. to the banks of the Rio Negro, the southern boundary of the Argentine Republic, is known under the name of Pampas. Though generally considered as one plain, extending on a perfect level from the shores of the Atlantic to the base of the Andes, it has been observed that nature has divided it by some tracts of more elevated ground into several regions, which differ in soil and fertility. The most remarkable and best known of these elevated grounds begins on the shores of the Atlantic between Cape Corrientes and Punta Andres, south of 38° S. lat., with rocks, which at some distance from the sea rise to the height of hills, having broad summits in the form of a table-land, and steep sides. This range of hills, which is called the Sierra del Vuulcan (opening), is only a few hundred feet high, and has excellent pasture on its summit. About 40 miles from the sea the ridge is interrupted by a wide gap or opening (called by the aborigiues Vuulcan), and on the west of this opening rises another ridge, which has various names, being broken by several other gaps, and extends in a south-eastern and north-western direction about 200 miles from the Atlantic. Where this elevated ground approaches 61° W. long., it turns to the north, and runs in that direction to 35° S. lat., when it turns more to the west, and may be said to terminate where the parallel of 34° cuts the meridian of 62°. This part of the higher ground is a gentle swell, overtopped by low hills, which occur at great distances from one another, and by a few low ridges. Though most travellers describe the country north of 34° in the direction of this swell as a perfect level, it is somewhat higher than the plains lying east and west, and it extends to the banks of the Rio Paraná, where the river is lined with cliffs about sixty feet above its level, between S. Nicolas and Rosario. This elevated ground separates the eastern portion of the pampas from that farther west. All the rivers which water these eastern pampas have their origin in this elevated tract. It is remarkable that the water of most of them is salt, especially in summer, when the volume is much diminished, though they flow through a country which is not impregnated with saline matter. From this it may be inferred that extensive deposits of salt must exist in the high ground on which they originate.

The Rio Salado, which rises near the point where the parallel of 34° cuts the meridian of 62°, runs in an east-south-eastern direction about 300 miles, and divides the *Eastern Pampas* into two nearly equal parts. Though numerous settlements have been made in the country north of the Rio Salado, by far the greatest part of it is still in its natural state. It is a continuous level plain, covered with coarse luxuriant grass, growing in tufts and partially mixed with wild oats and trefoil. Extensive tracts are entirely overgrown with thistles from six to eight feet high, which are used for fuel, as the country is entirely devoid of trees and shrubs. Near the dwellings of the inhabitants, only single trees are met with. The level plain contains shallow depressions, in which the rain-water is collected and forms pools. This water evaporating in the dry season, these depressions are then covered with rich grass, which supplies pasture during the hot weather. Thus this country is able to maintain immense herds of cattle and horses; and it is observed that the coarse grass and the thistle gradually disappear when trodden down by the animals, and are replaced by a fine turf; this is especially observable in the neighbourhood of the town of Buenos Ayres. Though the rearing of cattle is still the principal object of agriculture, sheep have much increased of late years, and wheat has been more cultivated. The latter is now grown to such an extent, that not only the importation from the United States of North America has been entirely stopped, but flour and corn have been shipped to Brazil: wool also forms an important article of export. Though the rivers are dry in summer, except the Rio Salado and the largest of its affluents, whose water cannot be used on account of its saltness, fresh water may be procured at no great depth by digging wells. Along the banks of the La Plata and Rio Paraná, between Buenos Ayres and the small town of S. Pedro, there is a broad belt of low ground, which is annually inundated by the freshets of the Rio Paraná for several months, and fertilised by the muddy deposit of that river.

The country south of the Rio Salado is of a somewhat different character. Near the banks of the river it is on a level with the country north of it, which it resembles in every respect; but about ten miles from the river swamps begin, which extend over a great part of this region. Towards the sea the swamps are nearly 100 miles wide; but farther west they grow narrower, until they terminate at the confluence of the Rio Salado with the Rio Flores. These swamps are thickly set with tall canes and reeds, and in many places interspersed with small lakes and ponds. They probably owe their existence to the circumstance of their surface constituting a perfect level, which receives numerous streams, the waters of which cannot make their way to the Rio Salado or to the sea. These swamps form a great obstacle to the extension of agricultural settlements; for though the country along the base of the Sierra del Vuulcan and the more western ranges of hills appears in no respect to be inferior in fertility to the country north of the Rio Salado, no agricultural settlements have been established here.

North of the Bahia Blanca (near 39° S. lat.) a mountain of considerable elevation rises abruptly over the plain: it is called Sierra Ventana, and its elevation above the sea-level is about 3500 feet. This mountain extends north-west for about 20 miles, but grows lower towards the west, where it is separated by a depression from another and lower ridge, that runs in the same direction, and is called Sierra Guamini. So far this country is known, but farther west it has not been explored. It is however known that in the same direction there occurs a vast forest, three days' journey long, which covers a hilly tract, and other forests of a similar description occur in the centre of the Pampas, and lie in the same direction.

The country between the Sierra del Vuulcan and the Sierra Ventana and the ridges dependent on them, resembles in its natural features the country south of the Rio Salado. Along the base of the Sierra Ventana extends a level country, interspersed with some low hills; the surface is dry, and fit for agricultural establishments. But in approaching the chain of the Sierra de Vuulcan, Darwin found the country, to the width of 80 miles, covered with swamps. In some parts there were fine moist plains, covered with grass, while others had a soft, black, and peaty soil. There were also many extensive but shallow lakes, and large beds of reeds. He compares this tract with the better part of the Cambridgeshire fens. These swamps probably owe their origin to the rivers which descend with a rapid course from the Sierra Ventana and Sierra Guamini to the level country.

The greatest part of the *Western Pampas*, namely, all the country west of 62° W. long., and extending thence to the Andes between 34° S. lat. and the Rio Negro, is almost unknown, having only been explored along the courses of the rivers, except in one line, in which it has been traversed by land. The few points which have thus been examined are too isolated to authorise us to form an idea of the capabilities of this immense country. But we are well acquainted with that portion of the plain which lies between 33° and 34° S. lat., as it is traversed by the great road that leads from Buenos Ayres to Mendoza, and thence over the Andes to Chile.

In the country which surrounds the sources of the Rio Salado, the soil of the plain begins to be impregnated with muriate of soda, and continues more or less so to the base of the Andes. But it has a different character east and west of 66° W. long. East of that meridian, a great part of the surface is covered with extensive saline swamps overgrown with reeds; the more elevated spots of these swamps are covered with a saline efflorescence. The dry tracts which intervene between the swamps are overgrown with a coarse grass that attains a height of six feet, and resembles rye or wild oats. This grass grows in clumps, and is salt to the taste. The soil consists of a dark friable mould, without the smallest pebble in it. In every part of this country there are lakes containing salt water. Many of them are from 10 to 20 miles long, and nearly as wide. These lakes are most numerous between 64° and 65° W. long., where an extensive shallow depression occurs, perhaps 50 miles in length and 20 in width. The whole of this depression is filled with water, when the Rio Quinto, which originates in the Sierra de Cordova, is raised by a freshet from the mountains, at which time it sends a great portion of its waters into this depression. When the water has been evaporated by the heat of the summer, it only remains in the numerous lakes and ponds with which the depression is interspersed. Where the plain approaches the hilly country that surrounds the south side of the Sierra de Cordova, the surface is broken in many places into low hills, with a steep ascent and furrowed by ravines; the hills are separated from each other by grassy plains. The grass is smooth, short, and thick, and there are low bushes on it. The hills are partly clothed with thorny trees of a stunted growth, and with brushwood. The rivers which intersect this country run in beds from 20 to 40 feet below its surface; their banks are very steep, but during the greater part of the year there is no water in them. It is only in the hilly tract of this part of the Western Pampas that there are any agricultural settlements: in the level country there are only cattle-farms.

The plain which extends from 66° W. long., to the base of the Andes presents a less level surface. The soil consists of loose sand, impregnated with saline matter, and unfit for the growth of grass. The vegetation is limited to low thorny trees, some resinous bushes, and saline barilla plants. But this arid and sterile soil, when irrigated, is changed into the most fertile fields. The saline matter, as it seems, when applied to a soil so light, becomes by the assistance of constant moisture the most active stimulus to vegetation, and serves as a never-failing manure. The rivers in this region, being very little depressed below the general surface of the plain, are extensively used for irrigation, and the settlements on the Rio Tunuyan, Rio de Mendoza, and Rio de S. Juan are rather numerous, and rapidly increasing in extent and number. Indian corn and wheat are grown to a great extent, and exported to the neighbouring countries. The soil seems particularly adapted to fruit-trees. The plantations of vines, figs, peaches, apples, olives, and nuts are very extensive, and their produce goes to the neighbouring countries, especially to Chile.

The Argentine Republic contains also an extensive tract of hilly country, which lies between the rivers Paraná and Uraguay. In the northern part of this region is the Laguna de Ybera, which extends from north to south in some places nearly 100 miles, and nowhere less than 40; and from east to west about 80 miles. It covers an area of more than 3000 square miles. A narrow strip of elevated ground divides its northern border from the Rio Paraná, and it is supposed that it is supplied with water from that river by infiltration, as no stream enters it, and it supplies with water four small rivers, one of which, the Mirinay, runs to the Uraguay, and three others to the Paraná. The surface of this low tract however is only a deep swamp, interspersed with numerous small lakes. It is chiefly covered by aquatic plants and shrubs, but in most parts it is impassable The country extending southward from this lake to the confluence of the Paraná with the Uraguay has an undulating surface, the heights seldom rising into hills, except in the interior and at a few places along the Paraná. It is chiefly overgrown with trees, between which there are some savannas of moderate extent. On the plains numerous herds of cattle are pastured, which constitute the wealth of the country. Though the trees are of stunted growth, the entire want of forests in the surrounding countries makes this wood of great demand for the ordinary purposes of cabinet-work, carriages, and as timber for small houses. The interior of the country appears to be much more hilly than along the rivers, and is occupied by the forest of Monteil, which extends more than 100 miles from north to south, with an average width of 40 miles. It is encumbered with brushwood and studded with small trees. At the southern extremity of the country, along the banks of the Paraná, there is a low tract, which is subject to occasional inundations. That portion of this country which extends from the lake of Ybera in a north-eastern direction to the boundary-line of Brazil, is known under the name of the Missiones, from the circumstance of the Jesuits having collected here a great number of aborigines, and accustomed them to a civilised life. The south-western part, which is undulating, has a soil of great fertility, producing cotton, sugar, and other tropical productions. To the north-east of it, the country rises into high hills and mountains, which are covered with high timber-trees, the most southern which occur east of the Andes from the Strait of Magalhaens.

Rivers.—All the rivers which drain the Argentine Republic, as far as it is situated north of 34° S. lat., carry their waters to the wide æstuary called La Plata. [PLATA, RIO DE LA.] Before they reach this fresh-water sea, they form two large rivers, the Paraná and the Uraguay. The Paraná originates hardly twenty miles from the shores of the Atlantic, on the table-land of BRAZIL. [Vol. v., p. 357.] After leaving that country at its confluence with the river Iguasú, the Paraná continues to run between the Argentine Republic and Paraguay in a southern direction for about 50 miles, when it gradually turns to the south-west, and continues in that direction to the large island of Apipé, a distance of about 100 miles. This part of the river is not navigable in all its extent, as there are several rapids and small falls, the last in the neighbourhood of the island of Apipé. This large island, with whose dimensions we are not acquainted, is the point where the uninterrupted navigation of the Paraná begins, and where large quantities of timber are shipped, the river being navigable for vessels of 300 tons burden. From Apipé the river runs westward nearly 100 miles, when it is joined by the Rio Paraguay from the north, and at the point of confluence it suddenly turns to the west of south. Below the junction with the Paraguay, the width of the river varies from one mile and a *half* to two miles, but the whole volume of water seldom flows in one channel, as the current is divided by a continuous series of islands overgrown with low trees and subject to inundations. These islands and the numerous sand-banks render the navigation slow and tedious. At Santa Fé the river begins to divide into various branches, and to run southward. After a course of about 100 miles it turns to the south-east at Rosario, and thence to its mouth in the La Plata the number of its branches increases. It opens into the La Plata with a large number of embouchures, forming a long but comparatively narrow delta, composed of a great number of islands. The most northern branches fall into the wide mouth of the Rio Uraguay. Its principal outlet is that which is called Paraná Guazú (the Great Paraná), in which there is seldom less than two fathoms and a half of water. The mouth called Paraná de las Palmas is the deepest, next to the Guazú. The Paraná runs nearly 900 miles within the boundary of the republic, of which 750 miles are navigable for vessels of 300 tons all the year round. From July to December the river preserves its natural level, but towards the end of the year, the intertropical rains having filled the upper branches, it begins to rise, and continues to do so for four months, to the end of April. The average rise below its junction with the Paraguay is stated to be 12 feet. It then inundates the adjacent grounds, especially below Santa Fé, and the tracts which are thus laid under water are said to cover a surface of 4000 square miles, an estimate which is perhaps overrated. The water leaves behind a grey slimy deposit, which is very favourable to vegetation. At the end of April the water begins to fall, and the fall is somewhat more rapid than the rise.

The Paraguay, the largest of the affluents of the Paraná, originates likewise in Brazil. [Vol. v., p. 356.] Having passed through the Estrecho de S. Francisco (20° S. lat.), at the Fecho dos Morros, it continues to flow with a gentle current in a southern direction, dividing Paraguay from the Gran Chaco, until, at 25° 30′ S. lat., and about 20 miles below Asuncion in Paraguay, the channel is narrowed at a place called Angostura by protruding rocks, between which the current runs with great rapidity. From this point it runs west by south to its junction with the Paraná. Vessels of considerable size may navigate this river within the boundaries of the republic, through which it runs about 400 miles. The channel in these parts being confined between high banks, the water rises 30 feet, but the inundations of the adjacent tracts are not extensive. Its waters are increased by two large tributaries, the Pilcomayo and Rio Vermejo. The Pilcomayo rises in the Andes, in two branches. The southern, called Rio de S. Junan and afterwards Pilaya, originates in the Despoblado; and the northern, the proper Pilcomayo, derives its waters from the numerous rivers which descend from the Andes between the Despoblado and the vale of the Desaguadero in Bolivia, and partly also from those which originate in the mountains that enclose that vale. These two rivers receive the drainage of the eastern declivity of the Andes between 19° and 23° S. lat., and unite after a course of about 350 miles, near 20° 40′ S. lat. and 62° 50′ W. long. After the union of these branches the Pilcomayo is a broad and deep river, and runs about 700 miles to its junction with the Paraguay, first easterly and afterwards to the south-east. In this part of its course it flows with innumerable windings through the Gran Chaco, where it is joined by no large river, and where its waters are gradually absorbed by the arid country through which it runs. Thus it becomes extremely shallow, and neither of the two arms into which it divides 200 miles above its mouth is navigable, even for small boats, to a distance exceeding 100 miles from the Paraguay. These two arms are called Araguay Guazu and Mini. The Vermejo derives its waters from the Despoblado, the Abra de Cortaderas, and the table-land of Yavi, descending from which elevated regions it forms two rivers, the Rio de Tarija on the north, and the Rio Lavayen on the south. The first, turning southward, joins the second at the eastern base of the table-land of Yavi, and both form the Vermejo, which flows about 700 miles through the Gran Chaco with numerous windings, until it joins the Rio Paraguay nearly 40 miles above its confluence with the Paraná. The Rio Vermejo is navigable for large boats as far as the union of its great branches.

The largest affluent of the Paraná, next to the Paraguay, is the Salado. This river rises on the southern border of the table-land of the Despoblado under the name of Cachi, and runs southward until it meets the river Santa Maria, which comes from the Sierra de Aconquija, when it turns east by north, and is called Guachipas. Having drained the valley of that name, it enters the plain of Salta, where it is joined by some smaller rivers, and turns south-west, flowing through the opening between the Sierra de Aconquija and Sierra Lumbre, where it is called 'El Passage.' At this place it is traversed by the road leading from Cordova to Salta, and is fordable in the dry season, but during the rains the passage is so dangerous that all communication between the southern and northern provinces is interrupted. A few miles farther south it enters the desert country, where the waters imbibe a brackish taste, from which its name is derived, and which it preserves the whole way to its junction with the Paraná near Santa Fé. Its course through the plains is more than 800 miles, of which about one-half, as far up as the small town of Matara, is said to be navigable.

There is a peculiar system of drainage in the western Pampas along the base of the Andes, between 31° and 36° S. lat. The waters which descend between these parallels from the eastern declivity of the mountains are collected in three systems of lakes, united by channels by which the surplus water is carried from one system of lakes to the other. As these channels lie from north to south, it is obvious that the northern system is the most elevated, and the southern the lowest. The most northern, called the lakes of Guanacache, occurs between 31° 40′ and 32°. Neither the number nor the extent of these lakes is exactly known. Their margins are covered with salt incrustations during the winter and spring. These lakes receive two fresh-water rivers, the Rio de S. Juan and the Rio de Mendoza, both of which rise in the Vale of Uspallata between the two ranges of the Andes. The Rio de S. Juan drains the northern part of the vale for about 100 miles, breaks through the Paramilla range near 31° S. lat., flows eastward about 50 miles, and then southward a somewhat greater distance. Its waters in the plain are used for irrigation. The Rio de Mendoza, or de Luxan, drains the southern districts of the Vale of Uspallata for about 50 miles, then turns eastward, passing by a chasm through the Paramilla range, and then declining to the north, it likewise reaches the lakes of Guanacache. The waters of this river also are used for irrigation. It is supposed that the Rio Vermejo, which waters the Vale of Guandacol, also reaches the lakes of Guanacache by a southern course; but the waters of this river, which are fresh in the vale, imbibe a brackish taste in the salt plains which it traverses after issuing from the vale. From the lakes of Guanacache a river issues, which at first runs east and then south, and, after a course of about 250 miles, falls into the second system of lakes, those of the Bevedero. This river is called the Desaguadero, and flowing through a level country slightly elevated above its banks, it expands in some places to a great width, converting the adjacent tracts into salt swamps. The water of this river is only fresh during the early season of the year (from December to March), when the snow on the Andes melts; during the remainder of the year it is salt, and its banks are covered with saline incrustations. The lakes of the Bevedero are likewise imperfectly known, both as to number and extent. The name Bevedero properly applies only to the most northern of these; the waters are salt for nine months of the year, and on its banks salt is collected for sale in that season. These lakes lie between 33° 30′ and 34° 30′ S. lat. and between 66° and 67° W. long., and, besides the Desaguadero, receive the waters of the Tunuyan. This river drains the vale of the same name, which is enclosed by two ranges of the Andes, breaks through the eastern chain below the Portillo pass, then runs through the plain, first northward and afterwards eastward, falling into the lakes of the Bevedero after a course exceeding 200 miles. Its waters are used for irrigation. All the waters of the Rio Tunuyan do not reach the lakes, but a portion of them is carried southward by an arm called Rio Nuevo, which falls into the Rio Diamante. The country between the lakes of the Bevedero and the Rio Nuevo being very low and level, the lakes, when swelled by the increased supply of water during the melting of the snow on the Andes, inundate this intermediate tract, and discharge their waters into the Rio Nuevo, which must therefore be considered as the drain of these lakes. The Rio Diamante rises on the eastern declivity of the peak of Cauquenes, a snow-capped summit of the Andes, and runs eastward for about 150 miles, when it is joined by the Rio Nuevo. Formerly it did not unite with that river, but joined the Rio Atuel: in the year 1812 it changed its course. After the junction with the Rio Nuevo, it flows southward under the name of the Rio Salado, or Desaguadero del Diamante, and after a course of about 150 miles more, it joins the Chadi Leubu. The last-mentioned river is very little known. Its principal affluent seems to be the Atuel, which rises south of the volcano of Peteroa, and flows eastward. After its junction with the Desaguadero del Diamante, it runs about 36 miles, and is then lost in the Urre Lauquen, a lake of considerable extent, but very imperfectly known, in 37° S. lat.: its waters are very salt, whence it derives its name, which, in the language of the Ranqueles, signifies bitter lake.

Of the rivers falling into the Atlantic south of the La Plata, we have mentioned the Rio Salado of Buenos Ayres, which is unfit both for irrigation and navigation. The Cobu Leubu, or Rio Colorado, was until lately almost entirely unknown, but it is now ascertained that it rises in the Andes, and flows without interruption to the sea. It is said that it is navigable only about 100 miles from its mouth. Near the mouth it divides into several arms, including an extensive delta. In December it is much swollen and runs with great rapidity. The Cusu Leubu, or Rio Negro, which now is considered to constitute the southern boundary of the Argentine Republic, rises within the range of the Andes in two branches; the Catapuliche, which runs south, and the Limay Leubu, or Rio de la Encarnacion, which flows north. After a course of from 80 to 100 miles, these two rivers join and break through the eastern range of the mountains by an easterly course, preserving the name Limay Leubu. After running about 100 miles north-north-east, the river is joined from the north by the Neuquen, a large affluent, which is said to be navigable for small craft more than 200 miles: after this junction the Limay Leubu takes the name of Cusu Leubu. The remainder of its course lies in an eastern and south-eastern direction for more than 400 miles. This river is navigable for large boats to the place where the two principal branches unite within the ranges of the Andes.

Climate.—The great differences of level within the territories of the Argentine Republic produce a very different climate in the various regions of which it is composed. It is very probable that the difference of heat and cold felt on the table-land of the Despoblado and the countries surrounding the Great Salina is the greatest that occurs on the American continent, though these regions are less than 300 miles from each other. We are not further acquainted with the Despoblado than that it does not admit of any kind of cultivation, which renders it probable that it is only about 1500 feet below the snow-line, and continually exposed to frost. Respecting the climate of Santiago del Estero, Temple says, that in December, 1825, during three or four days and with a hot northerly wind, the heat was so great that it blistered the skin on the face and hands even of those who remained in doors; that leaves fell scorched from the trees, and the bark of several became cracked and shrivelled just as if fire had been applied; and that the bolts, locks, and keys of the doors were so hot that they could not be retained in the hand. The inhabitants were afraid they should die by suffocation. The climate of the other parts of the country is between these two extremes; but as by far the greatest part extends in wide plains and most of the valleys are low, their climate is rather hot than cold, and in most places the summer heat is oppressive, being from 90° to 100°. As to rain, it is remarkable that, in the countries extending along the base of the Andes where rain falls, it generally does not come down in autumn and winter, as in the southern countries of Europe, but in spring, from October to January. No particular observations on the climate of these countries have been published, except some with respect to the Eastern and Western Pampas. The heat experienced in both is about the same, there being some slight frost in July and August, but there is a great difference in regard to rain and the moisture of the air. In the Western Pampas the air is extremely dry, and there is no dew at night; rain also is very scarce. But the Eastern Pampas are a very wet country. Rain occurs all the year round, and a heavy dew falls every night. In these parts sudden changes of the atmosphere are not rare; sometimes they raise or depress the thermometer 20 or even 30 degrees in a few hours. The abundance of moisture in the air and the sudden changes from heat to cold are due to the winds. During the greater part of the year the prevailing winds are northerly; and they bring with them the heated air of the lower latitudes, and, in passing over low and inundated tracts, take up a great deal of moisture; so that on arriving at the Eastern Pampas, the united effect of heat and moisture produces unpleasant impressions, like those of the sirocco of the Levant, causing lassitude and relaxation, though rarely disease. Then suddenly bursts out a *pampero*, or south-west wind, which, blowing over the immense extent of the dry pampas and proceeding from the Andes, rages with incredible fury, and is more like a West India hurricane than the gales experienced in countries without the tropics. The pamperos are sometimes accompanied by awful thunder-storms, and frequently by clouds of dust so dense as to produce darkness. They generally last only a quarter of an hour. But in 1793 one blew without intermission for three days, and the bed of the La Plata was laid dry for a distance of 10 miles from the shore, and many vessels which had been sunk years before in the river were visited by the inhabitants, who walked about in the bed of the stream without wetting their feet. The pampero however precipitates the moisture of the air, and restores to it its usual degree of elasticity. At Buenos Ayres the thermometer rose, in January, 1822, to 94°, and in August it sunk to 36°. The mean temperature of the year was about 62°; that of the summer (January, February, and March), 72°; of the autumn (April, May, and July), 58°; that of the winter, 54°; that of the spring (October, November, and December), 65½°.

A part of the pampas is subject to periodical drought of long duration, especially the north-eastern corner of the Western Pampas, which includes the northern part of the province of Buenos Ayres and the southern of Santa Fé. For three years (1827-30) so little rain fell, that even the thistles failed, and the whole country assumed the appearance of a dusty high road. Vast numbers of birds, wild animals, cattle, and horses perished for want of food and water. The lowest estimate of the loss of cattle in the province of Buenos Ayres alone was one million head. According to information collected by Darwin from the natives, these droughts are periodical, and occur at intervals of about fifteen years.

Productions.—Respecting the principal objects of agriculture, the Argentine Republic may be divided into two regions, which are separated from each other by the Gran Salina. On the north of it they partake of the intertropical productions: mandioc, rice, Indian corn, and the coca plant are cultivated in most of the lower valleys. In the more elevated tracts, tobacco and cotton succeed well, and are cultivated on a large scale. South of the Gran Salina the agriculture resembles that of southern Europe, except that no rice is raised. Wheat and Indian corn are the principal crops, but barley and lucerne are also extensively grown, especially near Mendoza. The northern region also produces some wild plants of great use, such as the algaroba tree, from the fruit of which, mixed with maize, the Indians make cakes, and by fermentation, *chica*, an intoxicating spirit; the quinaquina, the palm-tree, the plant from which the Paraguay tea, or maté, is taken, the cactus that bears the cochineal insect, the aloe from which yarn and ropes are made, and the indigo and some other plants used in dyeing. In the Gran Salina itself a kind of salsola grows from which soda is extracted. The fruit-trees which are cultivated are mostly those of southern Europe, as the vine, orange, fig, olive, peach, apricot, apple, and pear. On the banks of the Paraná *seda sylvestre* (wild silk) is collected, which is left in the woods by a certain caterpillar.

Though the cultivation of wheat has increased so much that it now forms an article of exportation, the principal exchangeable wealth of the republic is derived from their herds of cattle. The number of heads is above four millions, of which the province of Buenos Ayres alone is said to possess three. They wander about in the pampas nearly in a wild state, and the largest items in the list of exports consist of hides, hair, horns, tallow, and jerked beef. The horses, mules, and asses probably exceed two millions; they are exported to the West Indies and the island of Mauritius. Some attention has lately been paid to the rearing of sheep, and wool has of late years been exported to a considerable amount: goats and hogs are less common. Most of the South American wild animals are found in the republic, as the puma, the jaguar, the armadillo, the tapir, the tajassoo, the biscacho (a kind of rabbit, which is very numerous, and whose skins have lately been brought to England for furs), deer, and some kinds of monkeys. The guanaco is found in the plains and on the mountains, but the wild llamas, vicuñas, and alpacas only in the cold regions on the elevated table-lands. The water-hog, or carpincho (*Hydrochoerus Capybara*), the largest of the rodent animals in the world, is very common on the banks of the Paraná; Darwin shot one which weighed 98 pounds. The most common birds are the emu, the condor, green parrots, wild ducks, pigeons and quails, the carrion-vulture, and several other rapacious birds. Serpents are not numerous, but there are many kinds of noxious insects, venomous spiders, bugs or bencualas, fleas, musquitos, and nignas. Locusts, as in all countries where arid plains are found, frequently destroy the crops. Bees are common in the countries along the Andes and on the Paraná, and wax is collected in several districts. The cochineal insect is reared on the banks of the Salado. Along the coast south of the La Plata, whales, sea-lions, and sea-elephants are numerous. Among the insects is one called clavillo from its resemblance to a little nail; it is smaller than the cochineal, and occurs only in Catamarca and Tucuman, where it is used for dyeing green the vicuña and alpaca wool.

Gold and silver occur in the Andes, and also in the Sierra de Cordova, but they are generally situated at such an elevation above the plains, that there is neither food nor fuel in their neighbourhood, and as the ore is not rich, they cannot be worked with advantage. Some of the mines are worked on a small scale. It is said that iron and lead are found in the republic. Salt is abundant in the Great Salina and south of it, with the exception of the Eastern Pampas; and rock-salt is said to occur along the eastern declivity of the Andes south of the Diamante river. In the same locality coal is also said to abound.

Inhabitants.—The population of the Argentine Republic consists of descendants of Spaniards, and of Indians. The whites have not settled here as masters, as in other countries farther north, where they have exempted themselves from agricultural labour. They are here cultivators of the ground, and chiefly look after cattle and horses. Those who look after the horses, and are called *gauchos*, live a wild life, and can hardly be said to be superior to the Indians. Their dress is a cloak (poncho), and they live exclusively on beef.

The Indians who are subject to the dominion of the whites are far from being numerous: the number probably falls short of 30,000 individuals. They are only found in the provinces north of the Great Salina. On the Despoblado and in the valleys surrounding it, they seem to belong to the Peruvian nation, and to speak the Quichua language. In the valleys of Caxamarca and Rioja they form distinct tribes, and live in villages distinct from the whites; their language is not the Quichua. Several families of the Guarani are still settled in the Missiones, and others established themselves in Corrientes and Entre Rios, after the expulsion of the Jesuits in 1767. The Indians who are not subject to the whites, and who are frequently at war with them, may be divided into the Northern and Southern Indians. The former inhabit the Gran Chaco, between the Rio Salado and the Paraguay and Paraná, and the latter the countries south of 35° S. lat. Only one independent nation has maintained its ground surrounded by settlements of the whites, the Guaycurus, who inhabit the country between the towns of Cordova and Santa Fé and as far north as the great lake called Laguna Salados de los Porongos. Twenty years ago this tribe was composed of only 800 or 900 individuals, and since that time they have probably been reduced to a still smaller number by the civil wars in the provinces; they seem to belong to the great nation of the Guaycurus, which inhabits the western banks of the Paraguay between 16° and 26° S. lat., and has rendered itself formidable both to the Spaniards and Portuguese. They have great numbers of horses, and dwell in low houses constructed of hides, which they move about with great facility. The attempts made to settle them in fixed places have hitherto proved abortive, as they are much attached to a wandering life.

The number of Indians in the southern districts of the Gran Chaco is small, and it seems that there are only a few families in the neighbourhood of the rivers. But on the banks of the Rio Vermejo and between it and the Paraná there is a great number of wandering tribes, some of which are powerful. The most numerous of these tribes are the Tobas, Mataguayos, and Matacos on the banks of the Vermejo, and the Guanas, Guaycurus, Yagas, Lenguas, and Ivirayaras between the Pilcomayo and Paraná. All these, with the exception of the Guanas and Matacos, adhere to a nomadic life, and live on the produce of their flocks and of the chace. They have also many horses. The men go naked, with the exception of a girdle of cotton round their loins; the women cover themselves with a large cotton cloth. The men are always on horseback. Most of these nations seem to belong to the race from which the Guaycurus have sprung, and all their languages are only dialects of one. They raise some Indian corn. The Matacos, who had been for some time under the care of the Jesuits, have fixed habitations, cultivate the ground, and a considerable number of them go every year in harvest-time to the province of Salta, where they are employed in getting in the crops. Though these northern tribes have generally not a friendly intercourse with the whites who are settled near them, they are not in a state of continual war with them, as is the case with the southern Indians. Though in most other respects they resemble the southern tribes, they are not so tall, and on the average not taller than the inhabitants of southern Europe.

The southern tribes have their pasture-grounds south of the Rio Salado of Buenos Ayres, and of 35° S. lat., which line was established in 1740 between them and the Spanish government. This line was secured on the side of the Spaniards by a few military posts, and, though the Indians from time to time made predatory incursions into the settlements, the whites lived in a state of comparative security. But during the confusion with which the establishment of the political independence of these provinces was attended, and during the war with Brazil, the Indians, becoming bolder, laid waste the country as far north as the Sierra de Cordova, killing the men, and making women and children captives. After several attempts to bring about a peaceful arrangement had failed, the government of Buenos Ayres sent a strong force against them, under the command of Rosas, the present dictator of Buenos Ayres, who scoured (from 1832 to 1835) the whole country as far south as the Cusu Leubu, killed many thousands of the Indians, and rescued 1500 whites who had been captured in the predatory expeditions of the natives. These active measures seem to have had a good effect, and at the same time the country as far south as the Cusu Leubu was annexed to the Argentine Republic. The Indians must accordingly now consider that they are only permitted to inhabit these countries with the consent of the republic. These southern tribes are divided into innumerable petty tribes or families, each governed by its own cacique, or *ulmene*, who occasionally claims by hereditary title, but has little authority, except in time of war, when all submit implicitly to his direction. These tribes are frequently quarrelling and fighting with one another, and are only united in their predatory excursions against the whites. They speak a common language, and seem to descend from the same stock as the Araucanians in Southern Chile. All these tribes are comprehended under three denominations: the Pehuelches (Pine-tree Indians) inhabit the Andes and the mountainous and hilly country along its eastern declivity; the Ranqueles (Thistle Indians) occupy the central plains, and are more troublesome than the others to their neighbours; the Puelches inhabit the country along the Atlantic, between the Rio Salado of Buenos Ayres and about 300 miles inland. This last-mentioned division of Indians is now on friendly terms with the whites. They are a tall race, averaging near six feet in height. They have numerous herds of horses. They eat the flesh of the mares and colts, and only occasionally eat bread of maize, which they obtain from the Spaniards in exchange for salt and cattle, and blankets made by their women. Their dwellings are made of hides sown together, and are easily moved. They are always wandering about in the wide plains in quest of pasture for their horses. All of them, men, women, and children, live more on horseback than on foot.

Political Divisions and Population.—Under the Spanish dominion, the countries now comprehended within the Argentine Republic were divided into four intendencias, Buenos Ayres, Cordova, Tucuman, and Salta. When these countries obtained their independence, a new division was made in 1813 and 1814, but as the physical character of the country had not been attended to in making this division, some of the new states again divided: at present there are thirteen republics. It was originally intended to unite them all under a central government, but the attempt that was made did not succeed. The states were dissatisfied with the authority and influence of the central government in their internal affairs, and they ceased to send deputies to the congress. We may therefore consider the Argentine republic as an aggregate of thirteen republics, quite unconnected with one another; and it is probable that for some time they will form no union. The nature of the country renders any union by conquest very difficult, and in many cases impossible. Each of the thirteen states is separated from its neighbour by extensive tracts either of desert or at least of uncultivated country, to penetrate which even with a small army is extremely dangerous. Though there has been some fighting among them for several years, we do not find that any two of these republics have united in one government. But the friends of liberty have to complain of another consequence of this division of the country into numerous small states. Deprived of assistance from their neighbours, most of them have already fallen under the authority of individuals, called dictators. To use the proper term, despotic governments have taken the place of republican institutions. In such circumstances it can hardly be hoped that republican institutions will again be formed, and perhaps the present despotism may assume the mild form of a monarchical government, and bring about a more uniform administration.

The estimated population of the provinces of the Rio de la Plata, in 1836-1837, according to Parish, is as follows:—

Buenos Ayres from .	180,000	to	200,000
Santa Fé	15,000	„	20,000
Entre Rios . . .	30,000	„	30,000
Corrientes . . .	35,000	„	40,000
Cordova	80,000	„	85,000
Santiago	45,000	„	50,000
Tucuman	40,000	„	45,000
Salta	50,000	„	60,000
Catamarca . . .	30,000	„	35,000
La Rioja	18,000	„	20,000
San Luis	20,000	„	25,000
Mendoza	35,000	„	40,000
San Juan . . .	22,000	„	25,000
	600,000	to	675,000

This is exclusive of independent Indians within the territory claimed by the republic.

States and Towns.—1. *Buenos Ayres*, the largest and most populous of the republics, has lately extended its southern boundary to the Bahia Blanca, a deep inlet and good harbour near 39° S. lat., and has a coast-line along the La Plata and the Atlantic above 600 miles in length, which however contains no harbour for large vessels, except that of the city of Buenos Ayres [BUENOS AYRES; PLATA, RIO DE LA], near the most northern, and that of Bahia Blanca at the southern extremity of the coast-line. That of Buenos Ayres is bad, but Bahia Blanca is a good one. The new boundary-line on the west runs northward from Bahia Blanca to Fort Melinque, curving eastward, and on this side the state is surrounded by countries which are still in the possession of the native tribes, no whites residing west of the line. A line drawn east-north-east from Melinque to the Arroyo del Medio divides it from the state of Santa Fé. The surface is estimated at 75,000 square miles, about 8000 less than the island of Great Britain. The whole country is a level plain, with the exception of the districts adjacent to the western line, which are somewhat hilly, and the ranges of the Sierras del Vuulcan and Ventana and those connected with them, which traverse the southern districts. A large portion of it is fit for agriculture, and by far the largest part of the articles exported from Buenos Ayres are drawn from this province, especially cattle, sheep, wool, and corn. All the inhabitants north of the Rio Salado are of Spanish origin, but the countries south of the river are mostly occupied by tribes belonging to the Puelches. The remains of extinct species of large animals, as those of the megatherium, are often found in the western districts. As this state alone has a coast-line, and consequently is thus brought into connection with foreign nations, the provincial government, though not by an express agreement, carries on the business of the Argentine Republic with foreign powers. The executive, according to the constitution, consists of a governor, or captain-general, as he is styled, aided by a council of ministers appointed by himself. He is responsible to the Junta, or legislative assembly, by whom he is elected. The Junta itself consists of 44 deputies, one half of whom are annually renewed by the people. But this constitution can hardly be said to exist, since Rosas, as dictator for life, has taken all the power into his own hands.

There is no town of importance in this state, except Buenos Ayres. [BUENOS AYRES.] S. Pedro and S. Nicolas, which are on the banks of the Rio Paraná, contain only from 500 to 800 inhabitants.

2. *Santa Fé* extends along the Rio Paraná from the Arroyo del Medio to the confluence of that river with the Rio Salado, and afterwards along the latter stream northward to an undetermined point in the desert. It is divided from Cordova by the low uncultivated tract in which the Laguna Salados de los Porongos is situated, and in which the rivers Primero and Segundo are lost. The southern is the only boundary which is not formed by a desert, the most southern settlements being contiguous to those of Buenos Ayres. But a large part of the surface is unfit for agriculture, though it supplies indifferent pasture for cattle. Cattle and mules are exported. It was some years since devastated by the Guaycuru Indians, who live within its boundaries, but this tribe is now nearly extinct. Among the inhabitants there are many of Guarani origin, who settled here after the expulsion of the Jesuits in 1768. Lopez has been dictator of this republic for many years. The town of Santa Fé, a meanly-built place, is on the Rio Salado, about 12 or 14 miles above its mouth; it consists of a square, and eight streets branching off at right angles from the corners of it, and contains between 4000 and 5000 inhabitants. It was formerly the entrepôt of the goods which were exchanged between the western states and Paraguay, but that branch of commerce has entirely failed, since Paraguay has broken off all connection with the adjacent countries. Of late it has established some overland trade with Monte Video, from which it receives foreign goods. Rosario, on the high precipitous banks of the Parana, has above 1000 inhabitants.

3. *Entre Rios*, so called from being situated between the rivers Uraguay and Paraná, comprehends only the southern portion of the country so situated, the boundary-line between it and Corrientes being formed by the rivers Guayquirara and Mocoreta, between 30° and 30° 30′ S. lat. The former falls into the Paraná, and the latter into the Uraguay. It has the great advantage of being abundantly watered by numerous small streams, and has extensive forests which supply fire-wood and materials for carpenters' work. The soil is in general fertile, and covered with luxuriant herbage, on which numerous herds of cattle pasture. Except a few families of Guarani origin, the country is inhabited by the descendants of Spaniards. Its government still preserves republican forms. The capital, Bajada, or Villa del Parana, which is situated on the eastern banks of the Parana and nearly opposite Santa Fé, is built on the top of a lofty gently-sloping cliff, whence it derives its name Bajada de Santa Fé, or the Descent to Santa Fé. It exports great quantities of hides and tallow, and contains about 6000 inhabitants. Concepcion de la China, on the banks of the Rio Uraguay, is a small place, with 1500 or 2000 inhabitants, and some trade with Monte Video.

4. *Corrientes* comprehends the northern portion of the peninsula formed by the two rivers Paraná and Uraguay. The soil is fertile and the climate warm. The principal productions are sugar, cotton, and tobacco; but these articles are only exported to a small amount. Rice and indigo are also grown. Within this state is the lake of Ybera. The capital, Corrientes, is situated below the confluence of the Rio Paraná with the Paraguay, and stands on a considerable elevation. It is rather well built, and contains 4500 inhabitants. Santa Lucia is also a place of some importance on the Paraná, with a population of about 2000.

The *Missiones*, which, according to the treaty between Brazil and Buenos Ayres, in 1828, are to constitute an independent republic, extend eastward from Corrientes, between the Paraná and Paraguay to the confines of Brazil. This fertile tract, which was very populous under the sway of the Jesuits, is now filled with ruins, and contained but a few thousand inhabitants before 1825; many of them perished in the following war, and others emigrated. They were of Guarani origin, and this country and Paraguay was the native country of that once numerous tribe of aborigines. Nothing is known respecting its present political condition and its population.

5. *Cordova*, the most important of the states, next to Buenos Ayres, comprehends the Sierra de Cordova and the surrounding hilly country, with some adjacent plains. It is divided by the Gran Salina from Santiago, Catamarca, and Rioja, and by a travesia, or desert country overgrown with stunted prickly trees, from San Juan. A sterile and thinly inhabited country lies between it and San Luis. On the south it extends to the country of the Indian tribes. The low sterile tract in which the rivers Segundo and Primero are lost, and the Laguna Salados de los Porongos is situated, separates it from Santa Fé. Thus it is much more fertile than all the countries which surround it. Numerous rivers descend from the Sierra de Cordova, but all are lost in the desert, with the exception of the Rio Tercero, which, during part of the year, with difficulty finds its way to the bed of the Carcarañal, which falls into the Paraná near Santo Espiritu below Santa Fé. This river would be navigable for six or eight months in the year, but for two small rapids, which however might easily be removed. The valleys within the Cordova mountains, and those which extend along their sides, have a fertile soil, and

maize and fruits are raised there in abundance, but the plains, as well as the declivities of the mountains, are only fit for pasture. Cattle and sheep constitute the principal wealth of the republic; hides and wool are exported to Buenos Ayres. Cordova, the capital, is built on the banks of the Rio Primero, in a narrow valley considerably depressed below the general surface of the country. Thus it is sheltered from the north and south winds, which, blowing alternately on the higher grounds, produce sudden changes in the atmosphere which are injurious to health. The town has a population of 14,000 inhabitants. The streets are regularly laid out, and the houses are built of brick, and better than in other towns in the interior; most of them have balconies. In the centre of the town is a spacious square, on one side of which is a neat town-hall, and on the other a fine cathedral. There are also ten other well-built churches, and a university erected by the Jesuits, which in former times was famous, but is now hardly better than a provincial college. This town was formerly the depôt of the European merchandise intended to be sent to Peru, but this branch of commerce no longer exists. The commercial connections of Cordova do not extend beyond Buenos Ayres. Alta Gracia, a neat town near the base of the Sierra de Cordova, contains 3000 inhabitants.

6. *Santiago* is of great extent, comprehending the western part of the Gran Salina, the country between the Rio Dulce and the Rio Salado, south of 27° 30′, and also a large tract of the Gran Chaco, to the east of the last-mentioned river. But the good land is of comparatively small extent, and almost entirely limited to a narrow tract along both sides of the Rio Dulce, and a still smaller tract on the banks of the Salado. Though the soil is sandy, it has great fertility in the neighbourhood of the river, producing plentiful crops of wheat and some good grass. Where it is not cultivated, it is mostly covered with large trees. In the deserts which surround the cultivated tract that species of cactus on which the cochineal insect lives is abundant, and a considerable quantity of cochineal (from 8000 to 10,000 lbs. annually) is sent to Peru and Chile. Some districts have good pasturage. The inhabitants, among whom are many Indians that speak the Quichua language, are industrious, and manufacture *ponchos* (cloaks) and coarse saddle-cloths or blankets. Some soda is extracted on the borders of the Great Salina from the salsola. This country is considered the hottest in South America. Santiago del Estero, on the right bank of the Rio Dulce, has about 4000 inhabitants, and exports cochineal and ponchos to Tucuman and Peru. Matara is a small place on the Rio Salado, where it begins to be navigable.

7. *Tucuman* comprehends the greater part of the slightly-inclined plain which extends from the base of the Sierra de Aconquija towards the Rio Salado, but does not reach its banks, being separated from them by a broad tract of waste land. The Rio Salado divides it from the nomadic tribes of the Gran Chaco, the Rio Tala from the state of Salta, and the Sierra de Aconquija from that of Catamarca. It unites great fertility of soil with abundance of water, and is the best cultivated state in the Argentine republic. Rice, wheat, maize, and tobacco are raised and exported. The declivities of the mountains contain timber and excellent grass. The cattle are larger than in any other state. In the mountains gold, silver, copper, and lead are said to exist, but no mines are worked at present. The capital, San Miguel de Tucuman, which stands on an elevated plain, has a hot but dry and salubrious climate. The inhabitants exceed 8000. It carries on a considerable trade in cattle and mules; the latter are sent to Bolivia.

8. *Salta* occupies the northern portion of the territories that belong to the Argentine Republic, and has every variety of soil and climate. On the east, where it borders on the Gran Chaco, the boundary-line has not been fixed. On the north it borders on the departments of Tarija and Potosi, in the republic of Bolivia, and is divided from them by the desert table-land of Yavi and the range called Abra de Cortaderas. It comprehends the Despoblado, whose climate resembles that of Siberia; the valley of the Guachipas, which in climate and productions represents Europe: and the Plain of Salta and the valleys of the Rio de Jujuy and Lavayan, which in both respects resemble the West Indies. Its commercial products consist of tobacco, sugar, and cotton. A great number of mules, which are bought in the southern provinces in a very lean state, acquire strength in the rich pastures of Salta, and are sent to Peru and Bolivia, and this traffic is one of the principal sources of wealth to the inhabitants. The mountains contain gold, silver, copper, and other metals, but these mines are little worked. Salta, the capital, is situated in a plain about ten miles wide and forty long. The streets are regular, but narrow, and the houses of brick, but not large. In the centre of the square are the government-house, the cathedral, and several public buildings. The population is estimated at 8000 or 9000. The commerce is not considerable. Jujuy is built in an extensive basin, surrounded by high mountains, on the banks of the Rio de Jujuy, an affluent of the Lavayen: it contains about 4000 inhabitants, and has some traffic, as the carriage-road leading to Bolivia terminates at this place, and the goods must be transported farther north on mules. At Jujuy begins one of the most extraordinary mountain-passes in the world. A narrow valley extends from the town to the summit of the range called Abra de Cortaderas, a distance of 90 miles by the road. The highest summit of this road appears to have an elevation of between 11,000 and 12,000 feet. Oran is a small town on the Rio de Tarija, about 30 miles above its junction with the Rio Lavayen. At this place the river navigation is said to commence.

Some years ago the inhabitants of Jujuy made an attempt to establish a government in their town, independent of the provincial government of Salta. We do not know how far this attempt has succeeded.

9. *Catamarca* comprehends the country between the mountain-ranges of the Sierra of Aconquija and Ambato on the east, and the Andes on the west, which is very little known. It consists of some valleys, running between mountain-ranges south-east and north-west, and terminating, at their southern extremity, on the borders of the Gran Salina, being thus separated from the other inhabited countries by high mountains and deserts. The rivers which water these valleys are lost in the Gran Salina. The climate is sultry, and especially so when the south winds blow, which come over the desert. It appears that maize and wheat are raised to a considerable extent, but cannot be exported over the mountains. It sends only cotton and red pepper to the adjacent countries, the latter chiefly to Buenos Ayres, where it is extensively used. The present capital is Catamarca, whose population is stated to be 4000. The first capital was called London, being founded at the time when Philip II. of Spain married Queen Mary of England. It is not known if that place is still inhabited.

10. *Rioja* comprehends the country between the Gran Salina and the Andes, from 28° to 31° S. lat., and consists of a narrow strip of cultivable land along the eastern base of the Sierra Velasco, and the two valleys of Famatina and Guandacol, to which a pastoral tract extending round the southern extremity of the Sierra Velasco must be added. The silver-mines of Famatina are very rich, but being situated above the line of vegetation, they are worked on a small scale. Only the northern districts of the country east of the Sierra Famatina are fit for agriculture. The state is divided into four departments, of which that lying east of the Sierra Velasco is called Arauco, and produces wheat, maize, and cotton. Its principal wealth is its vineyards. About 7000 barrels of wine, of sixteen gallons each, and 100 of brandy, are annually made, nearly the whole of which is exported. The capital, which is also that of the whole state, contains between 3000 and 4000 inhabitants, and has many substantial houses. The department of Famatina, which is included between the Sierra Velasco and Sierra Famatina, contains rich orchards in its northern districts, and exports some wine. The department of Guandacol lies between the Sierra Famatina and the Andes, and produces very rich crops of wheat. It is inhabited by aborigines, who hunt the vicuña in the adjacent mountains. The wool of the vicuña is the only article of export. The fourth department is called the Llanos, which is a desert plain, containing a great number of grassy oases, on which there are cattle-farms. It is stated that 16,000 head of cattle are exported annually.

11. *San Juan* extends along the eastern declivity of the Andes, from 30° 30′ to 32° S. lat., comprehending the northern part of the Vale of Uspallata and a large portion of the plain which separates the Paramilla range from the mountains of Cordova. The Vale of Uspallata is barren and nearly uncultivated. The soil of the plain consists of sand, and is without grass, but covered with stunted prickly trees of the mimosa kind. It is quite barren, and produces no kind of grain or vegetables, except where it is irrigated

by the sweet water of the Rio de San Juan and some of its minor affluents. This irrigation renders the land exceedingly fertile; without any other manure, they produce most plentiful crops of wheat and Indian corn. The ordinary crops of wheat are fifty for one, in better lands eighty or a hundred for one, and in a few places it is said to be two hundred and even two hundred and forty. The distance from a market and the difficulties attendant on the transport of heavy goods through desert plains, greatly diminish the value of this fertility. But as fruit-trees, especially vines, succeed very well in this soil, wines and brandies are exported to a considerable amount. This country contains the chlamyphorus. [CHLAMYPHORUS.] In the northern district, called Jachal, there are some gold-mines, whose produce is not great. The capital, S. Juan, on the banks of the Rio de S. Juan, is stated to have a population of 8000. It is the entrepôt of the wines and brandies which are sent to the other provinces.

12. *Mendoza* extends from 32° S. lat. to the old boundary-line (35° S. lat.), along the foot of the Andes, and includes the southern part of the Vale of Uspallata and the whole of that of Tunuyan. It contains the volcanoes of Aconcagua, Maypu, Rancagua, and Peteroa, and the Andes are here crossed by the most frequented roads which lead over the mountain-passes of Uspallata, Portillo, and Las Damas. The valleys of Uspallata and Tunuyan are barren and nearly uninhabited. The plain which stretches from the Andes eastward has a sandy soil and does not produce grain, nor even grass, without irrigation, but when irrigated it yields abundant crops of wheat, Indian-corn, and lucerne; the lucerne may be cut fourteen times in a year. Rain and dew are very rare, except in the southern districts on the banks of the Rio Diamante, where the rains are so abundant that corn may be raised without artificial irrigation, but agricultural settlements have only been established lately in this district. The vineyards and plantations of fruit-trees are extensive. The produce of this country is partly sent to the states farther east, and partly to Chile, as the following table shows:—

Exports of the Produce of the State of Mendoza, in 1827.

Where sent to,	Brandy.		Wine.		Corn & Flour.	Hides.	Soap.	Tallow.
	Pipes.	Loads.[*]	Pipes.	Loads.	Loads.	No.	Loads.	Loads.
Buenos Ayres	336	2144	290	3120	1098	670	..	..
San Luis . .	..	70	..	488	1634	..	60	..
Cordova . .	..	95	..	355	125	..	..	..
Santa Fé . .	..	81	..	172	469	..	..	..
Chile . . .	..	12	..	..	..	8700	571	88

In this table the dried fruits are omitted, as well as the mules. The dried fruits consist of figs, peaches, apples, nuts, and olives. They go mostly to Chile, whither also from 300 to 400 mules are annually sent. Mendoza, the capital of the state and the centre of its commerce, is situated at the foot of the Andes, 4891 feet above the level of the Atlantic, in a country irrigated by numerous cuts from the Rio de Mendoza. It is a neat and pleasant town; the houses are only one story high, and have porticos. The climate is dry and noted for its salubrity. The population may amount to 12,000. San Martin, or Villa-nueva, west of Mendoza, is a thriving place, with 2000 inhabitants.

13. *San Luis* comprehends that immense tract of country which extends between the state of Mendoza on the west and that of Cordova on the east. Its north-western part runs northward to the boundary of Rioja and the border of the Great Salina, and it reaches southward to the old boundary-line (35° S. lat.). No part of it possesses any considerable degree of fertility. The greatest number of the widely-scattered and isolated settlements, consisting mostly of cattle-farms, occur along the road leading from Buenos Ayres to Mendoza, in the hilly country, where tracts of grassy land alternate with ridges of hills and sandy deserts overgrown with mimosas. As the grass is coarse and long, the pastures are indifferent; still cattle, horses, mules, and sheep are abundant, and are exported to a small amount, together with some wool. The corn and maize which are raised are not sufficient for the consumption of the scanty population. The country between the Sierra de Cordova on one side, and Mendoza and San Juan on the other, is still worse. As no fresh-water stream runs through it, it cannot be irrigated, and, with the exception of a few spots, is a complete desert. San Luis de la Punta, the capital, is a poor village-like town, with 1500 inhabitants.

The countries within the boundaries of the Argentine Republic which are not included in the territories of any one of these thirteen republics, occupy perhaps one-fourth of its area. They are, on the north, the Gran Chaco, or Great Desert, and on the south, the whole tract south of the old boundary-line, with the exception of that portion which, by a decree of the junta of Buenos Ayres, has lately been appropriated to that state. As the inhabitants of both countries are, with few exceptions, nomadic tribes, there are no towns. But the Spaniards have formed a settlement on the Cusu Leubu, called Nuestra Señora del Carmen. It is built on the northern banks of the river, about fifteen miles from its mouth. The houses are small and irregularly placed. The population consists of about 2000 persons, of whom 500 are negroes. It has some commerce with the tribes of the Puelches, who live on the plains west of the town. Carmen sends a representative to the junta of Buenos Ayres. To keep the Indians who live on this large plain in due restraint, and to prevent them from invading the white settlements, the government of Buenos Ayres has established two lines of fortifications. A few forts have been erected along the course of the Cusu Leubu at those places where there is an easy passage over the river. The other line of forts runs along the western boundary-line of the state of Buenos Ayres, from the Bahia to the Fort of Melinque, and this line is intended to protect more immediately the settlements which lie to the east of it. But no line of forts protects the inhabitants of San Luis against the invasion of the native tribes.

Manufactures.—The most important branch of manufacturing industry is that of *ponchos*, or oblong square pieces of woollen cloth, with a hole in the middle, to pass the head through; they are used by the gauchos and other people as cloaks. The finest are made of vicuña skins, in the town of Santiago del Estero. Some woollen fabrics for men's and women's dresses are also made, as well as saddle-cloths. In some parts some coarse cotton-cloth was formerly made by the country-people for their own use, but this branch of domestic industry has been nearly abandoned since the introduction of British manufactures.

Commerce.—The internal commerce of the states is considerable, as most of them have some products which are either not at all or only to a small amount raised in the neighbouring states. Thus the cotton of Corrientes and of Catamarca, and the wines and brandies of Rioja, San Juan, and Mendoza, are transported from the places where they are grown, to the states which are most distant from them. Under the Spanish dominion great numbers of horses and mules (60,000) were annually sent to Peru and Bolivia, but at present the number exported to those countries appears to be small. The commerce by land with Chile is not considerable, being almost limited to the exports of the state of Mendoza, which have been already mentioned.

The maritime commerce of these countries, while they were under the sway of Spain, was not great. The official valuation of the average imports from 1792 to 1796, inclusive, did not exceed 2,606,754 Spanish dollars (586,520*l.*), though every article was sold at an exorbitant price. Since these countries have obtained their independence, and have been accessible to the vessels of all nations, the imports have increased so much that, at the comparatively low prices at which articles are now sold in those countries, their value in peaceable years amounts to about 7,000,000 dollars (1,575,000*l.*). But this commerce has experienced great interruptions and vicissitudes. Between 1821 and 1825 it was in the most flourishing state. From 1826 to 1828 foreign vessels were excluded by the Brazilian blockade. After that time the country was distracted by civil wars and political revolutions. Another interruption has recently been caused by the blockade of the French, which still lasts. Before the Brazilian blockade, the port of Buenos Ayres was the only place whence the produce of these states was sent to foreign countries; but since that time great part of the northern provinces have sent their produce to Monte Video, and received foreign merchandise by the same way. In 1822 the imports of Buenos Ayres amounted to 11,267,622 dollars (2,539,715*l.*), viz.:—

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[*] A load or cargo is equal to about 200 lbs.

	Spanish Dollars.
Great Britain sent to the value of .	5,730,952
France	820,109
Holland, Germany, Sweden, and Denmark	552,187
The Mediterranean . . .	848,363
The United States of North America	1,368,277
Brazil	1,418,768
China	165,267
The Havanna	248,025
Chile and Peru	115,674
	11,267,622

In the following years the value of the imports increased considerably; but after the Brazilian blockade, when Monte Video began to share this trade with Buenos Ayres, it decreased to the above-stated amount of about seven millions, which diminution however may partly be attributed to the political disorganization which has prevailed up to the present time.

The goods imported from Great Britain into Buenos Ayres consist of cotton cloth, plain and printed calicoes, linens, woollens, and silks; and besides hardware and cutlery, coarse and fine earthenware, glass, iron and steel, leather, tin and pewter wares, and tin plates, arms and ammunition, and a number of minor articles. France imports superfine cloth and linens, merinos, cashmeres, silks and cambrics, lace, gloves, shoes, silk stockings, looking-glasses, fans, combs, and jewellery. From Germany are imported cloth, linens, and cottons; from Holland, cloth, linens, gin, butter and cheese, and Westphalia hams; from Belgium, arms, especially swords and pistols; and from Sweden, iron, cordage, canvas, pitch, tar, and deals are imported. From the Mediterranean, Sicilian and Spanish produce are sent, of which the most important are the cheap red wines of Sicily, the common wines of Catalonia, brandies, olive oil, maccaroni, and dried fruits. They were formerly brought by British vessels from Gibraltar, but are now mostly carried in Sardinian ships. From Spain are imported some serges and silks, velvets, and Spanish snuff. Formerly great quantities of paper were brought from Spain, but that article is now sent from Genoa. From the United States of North America are imported spirits, soap, sperm candles, dried and salt provisions, tobacco, furniture, and deals. Some years ago great quantities of flour and coarse unbleached cotton-cloth were imported from these parts, but very little is now brought. Brazil sends to Buenos Ayres tobacco, sugar, coffee, and rice; and a great quantity of the maté, or Paraguay tea, of an inferior description. From China are brought in British vessels tea, silks, crapes, nankeens, wearing-apparel, tortoise-shell, earthenware, matting, and some minor articles. Havanna sends to Buenos Ayres sugar, coffee, and tobacco.

Exports from Buenos Ayres in 1822, 1829, and 1837.

Articles.	Value in 1822. Dollars.	Value in 1829. Dollars.	Value in 1837. Dollars.
Silver, coined and bullion	1,115,153	291,173	277,791
Gold, coined and bullion .	204,340	431,782	380,137
Copper . . .	2,321	—	—
Ox hides . . .	2,361,488	3,419,196	3,994,540
Horse hides . . .	421,566	96,844	38,046
Jerked beef . . .	350,652	329,638	446,192
Horns	47,110	90,000	26,070
Horse-hair . . .	114,411	110,046	211,116
Sheep-wool . . .	33,417	30,334	329,412
Chinchilla skins . .	36,308	33,125	13,268
Nutria skins . . .	29,247	179,268	129,632
Tallow	124,800	65,271	150,373
Bark	2,912	—	—
Cotton	—	1,936	480
Sheep-skins . . .	—	—	140,470
Flour	—	—	56,268
Corn	—	—	14,525
Sundry minor articles .	118,780	121,387	108,818
	4,962,505 or £1,116,563	5,200,000 or £1,170,000	5,637,138 or £1,268,356

Mules are occasionally exported to the West Indies and to the island of Mauritius. All the articles which occur in the above list are brought to Europe—except the jerked beef, which goes to the Spanish West Indies and Brazil; the corn and flour, which are exported to the last-mentioned country; and a considerable portion of wool and sheep-skins, which are carried to the United States of North America.

The average number of vessels which annually enter the port of Buenos Ayres is 240. In 1837 only 228 entered, and of this number 61 were British, 40 from the United States of North America, 42 from Brazil, 24 from France, 20 from the ports of the kingdom of Sardinia, 12 from Spain, 9 from Denmark, 7 from Hamburg, 4 from Sweden, 4 from Bremen, 2 from Portugal, and Tuscany, Holland, and Russia sent each one.

As the produce of the central and northern provinces is carried by land to Montè Video, and thence exported to foreign countries, we shall add the articles exported from that harbour, observing that the republic of Uraguay, of which Monte Video is the only commercial port, supplied probably less than one-fourth of the exported goods.

Table of exports from Monte Video in 1836, showing the quantities of each article, and the countries for which they were shipped:—

	England.	France.	United States.	Spain.	Sardinia.	Antwerp.	Brazil.	Havanna.	Total Quantity
Ox hides, dry, No.	61,718	108,428	38,848	67,026	7.668	87,942	3,270	119	372.019
,, salt, do.	124,666	13,288	297	230	—	2,901	—	—	141,382
Horns . do.	329,836	32,110	124,766	20.328	27,291	20,241	12,552	850	593,625
Jerked beef, cwt.	—	—	—	—	—	—	218,318	88,036	306,354
Horsehair, arrobas = 25 lb.	9,578	4,622	3,984	—	436	72	—	—	18,692
Cuttings of hides	4,468	764	1,584	—	960	—	—	—	7,776
Horse hides No.	15,920	46	20,144	1,121	—	170	—	—	37,401
Grease arrobas	14,857	—	2,710	—	—	192	1,419	4,390	23 568
Wool . do.	14,930	2,300	14,140	30	2,500	—	—	—	33,900
Sheep-skins doz.	1,937	2,636	4,070	353	837	—	22	—	9,855
Tallow . arrobas	6.158	4.112	452	3.787	2.123	450	2,425	1,847	43,182
Nutria skins, doz.	3,990	320	1,640	—	220	400	—	—	6,570
Mare's grease arrobas	2,944	—	59	—	—	—	—	—	3,003
Seal-skins No.	3,831	—	16.000	—	53	—	—	161	20,045
Tongues doz.	—	—	—	—	—	—	440	—	440
Mules . .	—	—	—	—	—	—	—	—	410
Horses . .	—	—	—	—	—	—	164	—	164
Bones tons	259	53	10	—	—	3	1	—	326

Vessels which entered and sailed from the port of Monte Video in 1836, with the estimated value of their cargoes:—

Countries.	Entered.		Sailed.	
	No. of Ships.	Value of Cargoes in Spanish dollars.	No. of Ships.	Value of Cargoes in Spanish dollars.
British . . .	58	1,172,658	57	951,423
Brazilian . .	62	713,793	62	825,440
American . .	50	217,402	48	295,829
French . . .	40	578,178	40	464,430
Spanish . . .	15	311,285	15	236,672
Sardinian . .	57	102,039	41	30,252
Portuguese . .	13	15,200	13	62,700
Other countries .	..	502,082	..	639,909
		3,612,637		3,506,655

More copious particulars on the commerce of the Argentine Republic are given in Sir Woodbine Parish's valuable book on Buenos Ayres and the provinces of the Rio de la Plata, from which these statistical facts are taken.

History.—Though Amerigo Vespucci sailed along the coast before the end of the fifteenth century, it does not appear that he observed the wide æstuary of the Rio de la Plata. It was discovered by Juan Diaz de Solis, who was sent to these parts in 1512, by the Spanish government, and he took possession of it, but did not form a settlement.

Sebastian Cabot was sent from Spain, in 1530, to make discoveries in South America. He traversed the La Plata, and following the course of the Rio Paraná to its confluence with the Paraguay, sailed up the first-mentioned river, but being prevented from proceeding far by shoals and cataracts, he entered the Paraguay, which he ascended to a point above the place where Asuncion is situated. He built also a small fort at the place where the Rio Tercero, or rather the Carcarañal, joins the Paraná (32° 30′ S. lat.), which he called Santo Spiritu, which however was destroyed by the Indians soon after his departure. The favourable account that he gave of the country called Paraguay induced the Spaniards to send a considerable force to these parts under the Adelantado Don Pedro de Mendoza, in 1534, who built a fort near the spot on which the town of Buenos Ayres now stands; and he then sailed to Paraguay to found the town of Asuncion. The fort was soon destroyed by the Indians. The Spaniards concentrated their forces in Paraguay, and from thence they gradually began to establish their settlements over the country.

In 1573, Don Juan de Garay founded the town of Santa Fé. In the mean time other Spaniards, who, for some time before had held undisturbed possession of Alto Peru, or the present republic of Bolivia, advanced southward, passed the Abra de Cortaderas, and founded Salta, Tucuman, and Cordova, about the same time that Garay built Santa Fé. The town of Buenos Ayres was founded by Garay in 1580. He built a fort sufficiently strong to repel the attacks of the Indians. All the countries thus conquered were joined to the viceroyalty of Peru, of which they formed a portion until 1777, when Buenos Ayres was divided from it, and constituted a separate viceroyalty. In the seventeenth century the Jesuits entered the country for the purpose of civilising the Indians and converting them to Christianity. Their progress was at first slow, but after the year 1692, when they obtained more extensive privileges, the conversion and civilisation of the Guaranis, who inhabited both banks of the Paraná above the island of Apipé, went on rapidly; and about the middle of the last century it was stated and believed that the Jesuits had succeeded in forming a powerful state. On the suppression of the Jesuits in 1768, it was found that the country was inhabited by about 100,000 peaceful and industrious Guaranis. Since that time the Missiones, as they are called, have rapidly decreased in population. At present the number of the inhabitants is stated to be under 8000. Though the attempts to convert the other tribes who inhabit the northern provinces were not attended with great success, the Spaniards had suffered less from their incursions than from the attacks of the southern tribes, who, from the time that they had obtained horses, adopted the habits of the Mongols and other nomadic nations of Upper Asia, and by their unexpected incursions laid waste the neighbouring Spanish settlements, and drove off their herds of cattle. If these natives had submitted to the orders of the hereditary chiefs, like the Mongols, they would probably have expelled the whites from the plains and confined them to the mountainous regions. The Spaniards tried all means to bring about a pacification, and they partly succeeded in 1740, when the course of the Rio Salado of Buenos Ayres and the parallel of 35° S. lat. were agreed upon as the boundary between the southern Indians and the Spanish settlements.

In 1805 the town of Buenos Ayres was taken by the British, but they were soon expelled. The inhabitants of the Argentine Republic, like those of the other Spanish colonies, did not submit to the authority of Joseph Bonaparte, and, in 1810, they organised an independent government in the name of king Ferdinand VII. But after Ferdinand recovered the throne of Spain, his measures respecting the American colonies created such disgust, that the states united and declared their independence in the town of San Miguel de Tucuman, the 9th of July, 1816; and in 1819, a federal government was projected, but the states refused to accede to it because they were made too dependent on the federal government. At the same time disunion and civil war broke out, which were attended by a rapid succession of political changes. The provincial government of Buenos Ayres underwent twenty changes between the 10th of November, 1819, and the end of January, 1821. In 1821 the government seemed to have acquired some consistency, at least at Buenos Ayres. But the ascendancy which the military acquired in the war with Brazil, brought on other revolutions after the conclusion of peace (1828), which continued until 1836, when Rosas was created dictator for life. At present the French have declared war against Buenos Ayres, and are blockading the port.

(Miers, *Travels in Chile and La Plata;* Beaumont's *Travels in Buenos Ayres, &c.;* Parish's *Buenos Ayres and the Provinces of the Rio de la Plata;* Robertson's *Letters on Paraguay; Surveying Voyages of the Adventure and Beagle;* Andrews, *Journey from Buenos Ayres, &c., to Santiago in Chile, &c.;* Temple's *Travels in various Parts of Peru;* Caldcleugh, *Travels in South America; An Account of the United Provinces of Rio de la Plata*, by Ignacio Nuñez; Pedro de Angeli's *Coleccion de Obras y Documentos, &c.;* French, *On the Province of Rioja in South America*, in the *London Geographical Journal*, vol. ix.; Gosselman, 'Some Notes on the Route from Cordova to Mendoza,' in the *London Geogr. Journal*, vol. ix.; Head's *Rough Notes taken during some Journeys across the Pampas and among the Andes.*)

PLATÆA, or PLATÆÆ, was a city of Bœotia under the ridge of Mount Cithæron, about 60 stadia, or rather more than 7 miles, south-west of Thebes. The river Asopus ran between, at nearly an equal distance from each. The Bœotians, who migrated from Arne in Thessaly, did not colonise Platæa until after they had occupied the rest of Bœotia (Thucyd., iii. 61); and it was from the first distinguished by a spirit of resistance to Thebes in her assertion of supremacy over the neighbouring country. The Platæans in fact were resolved to maintain their independence, and the Thebans were determined if possible to reduce them to the same condition as the other Bœotians. To prevent this, Platæa allied herself with Athens, the Lacedæmonians having referred them to that state as more capable of affording them assistance than themselves (B.C. 519). This connection appears to have determined the fortunes and conduct of the Platæans in succeeding times, for they were the allies of Athens at the battles of Marathon, Artemisium, and Platæa (B.C. 479), when the rest of the Bœotians joined the Persians, and also in the Peloponnesian War. One of the first events of this war was the unsuccessful seizure of Platæa by the Thebans, and one of the most remarkable was the siege of the same city by the Lacedæmonians, on the refusal of the inhabitants to give up their alliance with the Athenians. They held out to the last extremity, and on their surrender were put to death by the Lacedæmonians to the number of 200, the rest having escaped by a sortie in the night. This was done at the instigation of the Thebans (B.C. 427), who afterwards razed the city to the ground. The citizens were subsequently (B.C. 386) restored, in the year after the peace of Antalcides. (Paus., ix. 1, 3.) The city was however again destroyed by the Thebans, in B.C. 374 (Clinton's *Fast. Hell.*); and though Philip of Macedon promised to rebuild it, and its restoration was proposed on the capture of Thebes (B.C. 335) by Alexander, the final restoration of the Platæans was not effected till B.C. 315, sixty years after their last expulsion by the Thebans. (Clinton's *Fast. Hell.*, ii., p. 396.)

PLATA'LEA, the generic name by which Linnæus designates the *Spoonbills*. [HERONS, vol. xii., p. 167.]

PLATANTHE'RA is a genus of Orchidaceous plants, struck off Habenaria on account of the stigmatic processes of the column being small and inconspicuous, or altogether obsolete, instead of being lengthened into horn-like projections below the arms of the anther. The species are numerous, and inhabit the temperate parts of the Old World, but are rarely ornamental, and never of any known use. The 'British Flora' comprehends two species, *P. bifolia* and *P. chlorantha*, both white flowered, and called *Butterfly Orchis.*

PLA'TANUS. [PLANE.]

PLA'TINA, or PLA'TINUM, an important metal, although is was not known earlier than about the middle of the last century. It was first made known in Europe by Mr. Wood, assay-master in Jamaica, who met with its ore in 1741. In 1750 he published a paper upon it in the 'Philosophical Transactions.'

The name of this metal is the diminutive of *plata*, silver, given to it on account of its colour, and it was originally called *platina del Pinto*, because it was found in the auriferous sand of the river Pinto. It has since been found in Brazil, Columbia, St. Domingo, and in the Uralian Mountains.

Platina is separated from the sand and other matters with which it is mixed, by washing with a great quantity of water, from which the heavier parts of course subside, and these contain the ore in question.

The ore of platina is composed of irregular rounded grains, which are sometimes flattened; they are of various sizes, often very small, and occasionally they exhibit traces of crystallization; but these are probably derived from the presence of some other metal. These grains possess no cleavage. Fracture hackly. Hardness 4·0 to 4·5. Specific gravity 17·332. Opaque. Lustre metallic. Colour steel grey.

Berzelius has analyzed many varieties of this ore, from which we select two examples: (1) the ore of Barbacoas, in the province of Antioquia, Colombia, and (2) that of Goroblagodat in Siberia;—

	(1)	(2)
Platina	84·30	86·50
Palladium	1·06	1·00
Rhodium	3·46	1·15
Iridium	1·46	..
Osmium	1·03	..
Iron	5·31	8·32
Copper	·74	·45
Gangue	·60	1·40
	97·96	98·82

The process of purifying platina and of rendering it malleable is one of considerable complication and difficulty, and it is one which our space will not permit us to detail; we therefore merely refer to the late Dr. Wollaston's extremely interesting paper on the subject, contained in the 'Philosophical Transactions' for 1829.

The following are the properties of pure platina:—its colour is greyish-white, intermediate between silver and tin. When it is free from iridium, it is so very ductile, that it may be drawn into very fine wire, not exceeding the 2000th part of an inch in diameter; it is also very malleable, and may be beaten into thin leaves. According to Berzelius, when perfectly pure, it is softer than silver, and it is susceptible of receiving a fine polish. Of all metals it is the least expansible. Its density varies: when fused, it is 19·50; when forged, it is as high as 21·4 to 21·5.

Platina suffers no change by exposure to the air, nor is it oxidized when heated in it. It does not under any circumstances decompose water. It is infusible in the strongest heat of a smith's forge, but it may be melted by voltaic electricity or by the oxyhydrogen blowpipe. Of all metals, except iron and copper, it is the most tenacious: a wire of the diameter of 0·787th of a line is capable of sustaining a weight of about 274 pounds. Like iron, platina possesses the very valuable property of welding at a high temperature, and this enables us to form it into chemical vessels of great and daily use.

Oxygen and Platina, it follows from what has been already stated, have but little affinity for each other. It is not acted upon, and consequently is not oxidized, by the agency of any acid whatever; but when it is treated with nitro-hydrochloric acid (aqua regia), it is converted into a chloride, and when the protochloride is digested with heat in a solution of potash, a black oxide, or protoxide, is formed, part of which is dissolved by the excess of alkali, and part is precipitated; when sulphuric acid is added to the alkaline solution to saturation, the oxide of platina which it held in solution is precipitated of a greenish colour. It is a hydrate, which, when heated, first loses water and afterwards oxygen, and is reduced to the metallic state.

Protoxide of Platina is nearly black, very bulky, and has a good deal the appearance of charcoal. It decomposes readily and even with detonation at a heat below redness. It is soluble in sulphuric acid and hydrochloric acid, and in its nascent state some vegetable acids dissolve it. It is easily reduced by combustible bodies. The salts which it forms with acids are but little permanent, it being separated readily into metallic platina and peroxide.

It consists nearly of

One equivalent of oxygen	8
One equivalent of platina	98
Equivalent	106

Sesquioxide of Platina.—According to Mr. E. Dury, when sulphate of platina is decomposed by ammonia, and the precipitate boiled in a weak solution of potash, and then cautiously dried, *fulminating platina* is formed, which, when treated with nitric acid, leaves a grey powder, which is a sesquioxide, composed of

One and a half equivalents of oxygen	12
One equivalent of platina	98
Equivalent	110

It is also stated that this oxide may be obtained by heating *spongy platina* with potash, and then treating the residue with dilute nitric acid.

Binoxide of Platina may be prepared by precipitating sulphate or nitrate of platina with potash, and keeping the portions separate. The first is a hydrate of the peroxide, and the last a subsalt. The hydrate is to be moderately heated, so as to expel the water, but not any of the oxygen: the hydrate of this oxide is yellow, but when the water is expelled it becomes black.

It combines with most acids, and forms salts, which are brown or red; it has however a greater tendency to combine with alkalis and oxides than with acids.

It is composed of

Two equivalents of oxygen	16
One equivalent of platina	98
Equivalent	114

Chlorine and Platina do not act upon each other, unless the chlorine be in the nascent state, for if the metal be exposed to the gas even at red heat, or in solution in water, no action takes place between them, but the

Protochloride of Platina may be obtained by dissolving the metal in aqua-regia, or nitro-hydrochloric acid; in this case the nascent chlorine dissolves it, and by evaporating the solution to dryness, and exposing the residue to a heat of about 392°, until chlorine ceases to be evolved, the protochloride remains. This chloride is green, unalterable in the air, insoluble in water, or in sulphuric or nitric acid, but hydrochloric acid partially dissolves it, and the solution is red. At a high temperature it is totally decomposed, the chlorine being expelled, and metallic platina left. The caustic alkalis, potash and soda, decompose it, and separate protoxide of platina, which dissolves in an excess of the alkalis, and yields a deep green-coloured solution.

It is composed of—

One equivalent of chlorine	36
One equivalent of platina	98
Equivalent	134

Bichloride of Platina is obtained by evaporating a solution of platina in nitro-hydrochloric acid to dryness at a very gentle heat, when it remains as a red hydrate, which becomes brown when the water is expelled. This salt is deliquescent; very soluble in water, alcohol, and æther; the solutions which it forms are of a pure yellow colour; light decomposes them, metallic platina being deposited. When the solution contains excess of hydrochloric acid, orange yellow crystals are obtained, which are considered as a hydrochlorate of the bichloride; when subjected to a moderate degree of heat, the bichloride becomes protochloride, and at a red heat it is totally decomposed, chlorine being expelled, and metallic platina left.

It is composed of—

Two equivalents of chlorine	72
One equivalent of platina	98
Equivalent	170

Bromide of Platina is obtained by dissolving platina in a mixture of hydrobromic and nitric acids. It is of a reddish-brown colour and becomes a crystalline mass by evaporation. It is decomposed by heat. It is probably a bibromide, composed of—

Two equivalents of bromine	156
One equivalent of platina	98
Equivalent	254

Carbon and Platina have lately been combined by Zeise; they form a black powder, which is composed of—

Two equivalents of carbon	12
One equivalent of platina	98
Equivalent	110

Sulphur and Platina form two compounds: the

Protosulphuret of Platina may be formed by several processes, as by heating these elements together in an exhausted glass tube, or heating the ammonio-chloride of platina with half its weight of sulphur until the hydrochlorate of ammonia and excess of sulphur are entirely expelled; or by adding hydrosulphuric acid to protochloride of platina.

It is a grey or blackish powder of a metallic lustre, unaltered by exposure to air or water, and scarcely attacked even by boiling acids, but is decomposed when ignited with chlorate of potash. It consists of—

One equivalent of sulphur	16
One equivalent of platina	98
Equivalent	114

Bisulphuret of Platina is procured by mixing a solution of sulphuret of potassium with one of chloride of platina; the precipitated sulphuret is a black powder, which is to be dried in vacuo over sulphuric acid.

When it is exposed to dry on paper in the air, the sulphur absorbs oxygen, and becomes sulphuric acid, which acts upon and chars the paper.

It is formed of—

Two equivalents of sulphur .	32
One equivalent of platina . .	98
Equivalent . .	130

Phosphuret of Platina is prepared by subjecting spongy platina to the action of phosphorus: it is hard, brittle, of a silvery white colour, has a crystalline fracture, and is more fusible than silver; it is partially decomposed by heat, and completely so by roasting.

Iodine and Platina may be combined.

Protiodide of Platina is obtained by decomposing a solution of the protochloride with one of iodide of potassium: after the mixture has been for some time heated, a black, heavy, finely divided precipitate is obtained, which adheres to the fingers like charcoal; it has neither taste nor smell; is unalterable in the air, and neither water nor alcohol acts upon it at any temperature. It may be heated to above 482° Fahr. without decomposing, but at the heat of boiling mercury the vapour of iodine begins to rise, and at a still higher temperature it is entirely decomposed, spongy platina remaining. It is not acted upon by acids even when heated, but it is gradually decomposed by a solution of potash or soda.

It is composed of nearly

One equivalent of iodine . .	126
One equivalent of platina .	98
Equivalent . .	224

Bi-iodide of Platina is readily formed by mixing solutions of iodide of potassium and bichloride of platina; a crystalline black powder is precipitated on the application of heat, which, after washing with boiling-water, is to be dried in vacuo over sulphuric acid or by a water-bath. It is inodorous, insipid, and stains the fingers like the protiodide, and is not acted upon by boiling water, but is decomposed at a temperature of about 268°. It is soluble in cold alcohol, but more readily so in hot, and the solution is of a greenish-yellow colour, and not decomposed by water. Cold sulphuric acid does not act upon it, but when they are heated together, a portion of iodine is expelled.

It is composed of—

Two equivalents of iodine .	252
One equivalent of platina .	98
Equivalent . .	350

Boruret of Platina is obtained by fusing spongy platina with boracic acid and charcoal; the compound is hard, and slightly crystalline; when dissolved in aqua-regia, it yields chloride of platina and boracic acid.

Seleniuret of Platina. Spongy platina combines with selenium, with the evolution of much heat; it is a grey powder, which by exposure to heat and air is decomposed, the selenium evaporating, and the metal being left. Platina crucibles are acted upon by compounds of selenium, when the latter are heated in them.

Siliciuret of Platina is formed when platina is heated with charcoal in an earthen crucible: the silicium is yielded both by the earthy matter of the charcoal and of the crucible. A compound thus obtained was found by Berzelius to have a specific gravity of 13·3; it was granular and very hard; when put into aqua-regia, it was acted upon, and soon covered with a sufficient crust of silica to retard the action of the solvent.

The principal binary compounds of platina and non-metallic elements having now been described, we shall give a brief account of the more important binary compounds which its forms with the metals, or the

ALLOYS OF PLATINA. Most metals combine with platina, but little is known of its compounds with the metals of the alkalis and earths. According to Berzelius, potassium has considerable affinity for it, and they unite at a high temperature. When the alloy is treated with water, it is decomposed, and black scales are formed, which are composed of hydrogen and platina.

Arsenic and Platina readily unite: an alloy formed of 20 parts of the former metal and two of the latter is of a greyish-white colour, very brittle, fusible at rather above a red heat, is not acted upon by the air at common temperatures, but when it is heated it absorbs oxygen from the air, and is converted into arsenious acid, which is volatilized, and metallic platina remains. Jeannetty of Paris long employed this process for extracting platina from the native grains, and rendering it useful for crucibles, &c.

Antimony and Platina during combination evolve much light. This alloy is very brittle, fine-grained, and hard. It is decomposed at a high temperature, the antimony being oxidized and expelled.

Zinc and Platina form an alloy of a greyish-blue colour; it is so brittle that it is easily reduced to powder. At a high temperature the zinc burns, and a large proportion, but not the whole of it, is volatilized.

Tin and Platina yield an amalgam which is large-grained, brittle, and hard. The presence of a small quantity of platina is sufficient to destroy the malleability of tin.

Iron and Platina. Iron and steel render platina more fusible. Faraday and Stodart have examined the alloys of platina and steel, which appear to combine in all proportions. The alloys which contained from 1 to 3 per cent. of platina seemed best adapted for cutting instruments. When equal weights of the two metals are combined, a fine, hard, brilliant alloy of specific gravity 9·862 is obtained; it takes a fine polish, does not tarnish, and appears to be well adapted for mirrors; when 80 parts of platina are combined with 20 parts of steel, the alloy has a specific gravity of 15·88.

Nickel and Platina, combined in equal weights, form a pale yellow alloy, susceptible of a high polish, and obedient to the magnet.

Cobalt and Platina form a fusible alloy.

Copper and Platina combine in all proportions, and form alloys which are ductile or brittle, yellow or white, according to the relative quantities used. The colour of copper is diminished by platina.

Bismuth and Platina form brittle alloys, which are not entirely decomposed by cupellation.

Silver and Platina form alloys in all proportions; their colour is intermediate as to that of the metals. They are fusible and ductile, if the silver be in the larger proportion. Like the alloys of platina and iron, those of platina and silver are completely soluble in nitric acid, when there is a sufficient quantity of silver; they are also attacked by sulphuric acid, which dissolves the silver.

Lead and Platina readily combine, with the evolution of light. The affinity of these metals for each other is great, so that if platina and lead foil be rolled together, and one end of the roll be ignited, the mass becomes so strongly heated that it is dissipated in all directions.

Mercury and Platina amalgamate with difficulty; it is effected by exposing spongy platina and mercury to a high temperature. Mercury, when the amalgam consists of 37 platina and 63 mercury, is at first soft, but becomes eventually hard.

Gold and Platina combine in all proportions, and form fusible alloys. Platina destroys the colour of gold, even when it constitutes only 0·02 of the weight of the alloy.

Iridium and Platina. This alloy is perfectly malleable when the former metal amounts to only one or two per cent.; it is much harder than pure platina, and resists the action of heat and chemical re-agents much better than mere platina, and is particularly adapted for chemical vessels. A larger proportion of iridium renders the alloy so brittle that it cracks under the hammer.

SALTS OF PLATINA, or oxysalts, consist of acids and the oxides of the metal: they are not numerous, and have been but imperfectly examined.

Salts of the Protoxide. These are of an olive-green or greenish brown colour, and they are soluble in an excess of alkali, which renders them green; they are not decomposed by hydrochlorate of ammonia.

Salts of the Peroxide are yellowish-red or brownish-red; most of them are soluble in water, and perfectly decomposed at a white heat, leaving metallic platina; and there is thus obtained the metal in that finely divided state in which it is called *spongy platina.* These salts are precipitated by zinc, iron, and copper, and give a black precipitate of sulphuret of platina with hydrosulphuric acid and hydrosulphates.

The alkalis decompose these salts but imperfectly, on account of the formation of double subsalts. Protochloride of tin occasions no precipitate, but the solution becomes of a very characteristic and intense red colour.

Protosulphate of Platina is formed by adding the protoxide to the acid. It is a soluble salt, black or reddish, and which eventually becomes converted into persulphate and metallic platina.

Protonitrate of Platina is obtained by dissolving the protoxide in nitric acid; its properties are similar to those of the protosulphate.

Persulphate of Platina is procured by treating the bisulphuret with nitric acid. It is black, and may be combined with the alkaline sulphates, and it yields insoluble double subsalts when decomposed by the alkalis.

Pernitrate of Platina is of a deep brown colour, and is prepared by dissolving the peroxide in the acid; by evaporation it is easily converted into a subsalt, and double subsalts are formed when it is decomposed by the alkalis.

A numerous class of double salts, called *platino-chlorides*, have been formed and examined; they are obtained by adding the chlorides of potassium, sodium, &c., and hydrochlorate of ammonia, to the chlorides of platina; some are soluble and others are insoluble in water.

Mr. Brande gives the following statement of the

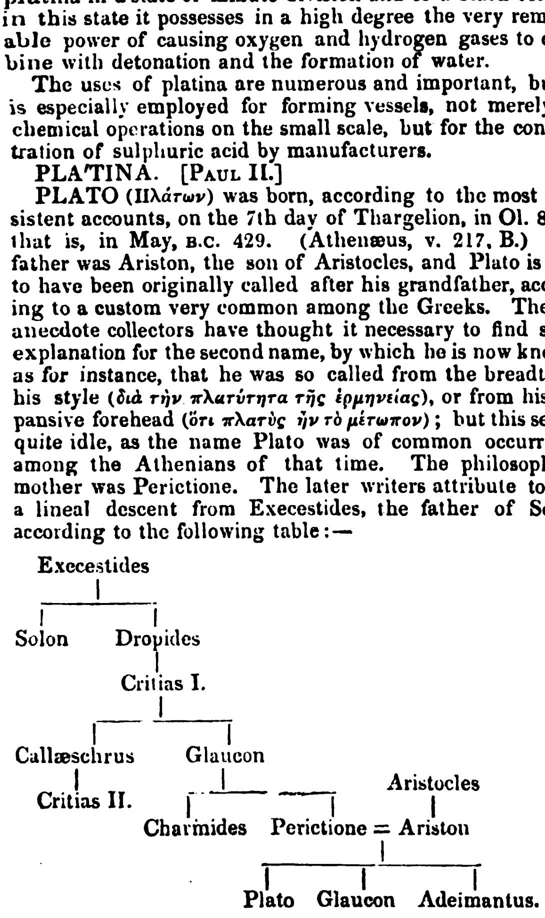
Characters of the Salts of Platina.—'The difficult solubility of the ammonio- and potassio-chlorides of platina, and the solubility of the corresponding sodium compounds, are very characteristic of this metal. Phosphate of soda produces no precipitate in chloride of platina; the ferrocyanide of potassium throws down the platino-chloride of potassium; cyanide of mercury occasions no precipitate; iodide of potassium communicates a reddish-brown colour to solutions of the chlorides of platina, and gradually produces a brown precipitate; and if the mixture be heated in a matrass, the glass acquires a strong coating of metallic platina. All the metals which reduce the chloride of gold, with the exception of palladium, act similarly upon chloride of platina, but its complete separation in the metallic state is slow: iron, zinc, cadmium, and copper are its most effective precipitants; they separate it in a black powder, which sometimes adheres in films to the glass.'

Tartrate of soda added to and heated with a solution of chloride of platina is a very effective precipitant of metallic platina in a state of minute division and of a black colour; in this state it possesses in a high degree the very remarkable power of causing oxygen and hydrogen gases to combine with detonation and the formation of water.

The uses of platina are numerous and important, but it is especially employed for forming vessels, not merely for chemical operations on the small scale, but for the concentration of sulphuric acid by manufacturers.

PLATINA. [PAUL II.]

PLATO (Πλάτων) was born, according to the most consistent accounts, on the 7th day of Thargelion, in Ol. 87, 3, that is, in May, B.C. 429. (Athenæus, v. 217, B.) His father was Ariston, the son of Aristocles, and Plato is said to have been originally called after his grandfather, according to a custom very common among the Greeks. The old anecdote collectors have thought it necessary to find some explanation for the second name, by which he is now known, as for instance, that he was so called from the breadth of his style (*διὰ τὴν πλατύτητα τῆς ἑρμηνείας*), or from his expansive forehead (*ὅτι πλατὺς ἦν τὸ μέτωπον*); but this seems quite idle, as the name Plato was of common occurrence among the Athenians of that time. The philosopher's mother was Perictione. The later writers attribute to her a lineal descent from Execestides, the father of Solon, according to the following table:—



It seems doubtful, however, whether Solon and Dropides were really brothers; that they were intimate friends and connections appears from the words of Plato himself in the *Timæus* (p. 20, E)[*]; but perhaps the claim of a direct descent from Execestides originated only in later times, when the admirers of the great philosopher lost no opportunity of exalting his family and investing his early youth with the wonders of fable. It is also stated that he was born in the island of Ægina, which was, about the time of Plato's birth, stripped of its inhabitants, and occupied by Athenian colonists (*κληροῦχοι*), among whom was Aristophanes, the comic poet.

As might have been expected from his connection with the most distinguished Athenian family, Plato received the best education that Athens could furnish: Dionysius taught him reading and writing (*γράμματα*); he was instructed in gymnastic exercises by an Argive wrestler named Ariston; his masters in music were Metellus of Agrigentum, and Draco of Athens, a pupil of the celebrated Damon. He was sufficiently skilled in wrestling to contend at the Pythian and Isthmian games, and his first literary attempts, the composition of dithyrambic, lyric, and tragic poems, show that he had profited by the instruction of his music-masters. He is also said to have applied himself to painting.

Plato's connection with Socrates is said to have commenced in B.C. 410. He had previously, and while very young, learned the doctrines of the Heracleitean philosophy from Cratylus (Aristot., *Metaphys.*, i., c. 6: *ἐκ νέου συγγενόμενος πρῶτον Κρατύλῳ καὶ ταῖς Ἡρακλειτείαις δόξαις*; Apuleus, *De Dogm. Plat.*, p. 2: *et antea quidem Heracliti secta fuerat imbutus*), who appears to have been a friend or acquaintance of Socrates. (Plato, *Cratyl.*, p. 430, C.) The assertion of Diogenes Laertius (iii. 6) that he learned the Eleatic doctrines from Hermogenes seems to be derived from this statement with regard to Cratylus, and from the circumstance that Hermogenes maintains the Eleatic opinions against Cratylus in the dialogue which bears the name of the latter.

On the death of Socrates (in May, B.C. 399), Plato betook himself to Megara, in company with several of his late master's followers. Related as he was to Critias and Charmides, who fell fighting side by side against Thrasybulus and his party, and professing, as he always did, sentiments harmonising rather with the oligarchical faction at Athens than with those of the truer patriots who wished for a restoration of the older constitution under which Athens had so long and so pre-eminently distinguished herself, it cannot be doubted that he was driven to this self-banishment from a fear for his own safety; and we shall be the more inclined to draw this inference when we recollect how intimately the prosecution of Socrates was connected with that reaction against the Thirty Tyrants and their supporters in which Lysias took so prominent a part. [SOCRATES.] We are not disposed to charge Plato, at this or at any other time of his life, with absolute treason against the liberties of his country; we are inclined however to hold with Niebuhr (*Kleine Schriften*, p. 476; *Philol. Mus.*, i., p. 494), that Plato may have been prejudiced against his native city in its constitutional form of government by the warm feelings of his youthful heart; 'but it is not the less true,' adds the historian, 'that, if so, he was not a good citizen.' While at Megara, he is said to have attended the lectures of Euclid, who was the head of a school there [EUCLID], and we find traces in several of his dialogues of an acquaintance with the peculiar doctrines of the Megaric philosophy. He afterwards went to Cyrene to visit Theodorus, the mathematician, who is introduced in the 'Theætetus' as living at Athens before the death of Socrates, and advocating the doctrines of Protagoras against that philosopher. From thence, we are told, he travelled to Egypt, where he spent thirteen years, collecting all the traditions which the priests could teach him; and it is said that he afterwards went to Persia to learn the doctrines of the Magi, and even became acquainted with the laws and religion of the Jews. (Lactant., *Institut.*, iv. 2; Clemens Alexandr., *Protrept.*, p. 46, A.) So late as in Strabo's time the traveller to Heliopolis was shown the house where Plato and his companion Eudoxus had lodged. (Strabo, p. 806, C.) That Plato visited Egypt is also stated by Cicero, in a remarkable passage (*De Republ.*, i. 10), and the story is not in itself improbable, especially if we admit the truth of his journey to Cyrene; it seems however exceedingly unlikely that he resided there so long as thirteen years, for he never speaks of Egypt like a person who was familiarly acquainted with the peculiarities of the country, and his philosophy was so much cultivated at Alexandria in later times, that a lie circumstantial, like that which Strabo relates, might easily have been fabricated on the spot. The other exaggerations with regard to Plato's travels in the East are highly absurd, and can only be accounted for from the great importance attributed to his philosophy by the early Christian writers, and by their wish to make out that the apparent coincidences between his system and the Christian revelation were not anticipations so much as proofs of his acquaintance with the traditions and prophecies of the East. There is probably more truth in the statement that, on his return from Egypt, he went to Tarentum to visit or renew his acquaintance with some renowned teachers of the Pythagorean school; he certainly did not go to Italy to learn the doctrines of this school; he might have learned them nearer home, for the celebrated Pythagorean Philolaus had been at Thebes before the death of Socrates; Cebes and Simmias heard him there (Cicero, *De Fin.*, v. 29; Diog. Laert., viii. 46); and Plato shows in his earliest works that he was not unacquainted with the tenets of the Pythagoreans.

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[*] Critias is here made to say of Solon, *ἦν μὲν οὖν οἰκεῖος καὶ σφόδρα φίλος ἡμῖν Δρωπίδου τοῦ προπάππου*: and the scholiast on the passage says, *λέγονται γὰρ οἰκεῖοι καὶ οἱ συγγενεῖς.*

This journey to Magna Græcia seems to be connected with the first of three visits which he paid to Sicily. Curiosity to see an eruption of Mount Ætna is said to have been the motive for this first voyage to Syracuse, which, it is stated, he undertook in the fortieth year of his age, therefore in B.C. 389. (Athen., xi., p. 507, B; Diod. Sic., xv. 7; Pseudo-Plat., *Epist.* vii., p. 324, A.) It was on this occasion that he became acquainted with Dionysius I., tyrant of Syracuse; with his son, Dionysius II.; and with Dion, brother-in-law of the former and uncle of the latter. He had the misfortune to offend the elder Dionysius by some freedom of speech; and the tyrant got Pollis, the Spartan ambassador, in whose ship he was returning to Greece, to sell him at Ægina as a slave. He was bought by Anniceris of Cyrene, who gave him his freedom; and, on returning to Athens, he set up a school in the Academy, where he taught for twenty-two years. After this he paid a second visit to Syracuse, at the request of Dion, to endeavour to form by philosophical instruction the ill-educated mind of his nephew, the younger Dionysius. He failed in doing this; and Dion being banished soon after, Plato returned to Athens with the tyrant's permission. This second journey is placed in B.C. 367, and Plato stayed four months in Sicily. His third journey to Sicily is placed in B.C. 361; it seems to have been undertaken in the hope of reconciling Dion and Dionysius. Plato's stay at the tyrant's court became disagreeable and dangerous to himself, and it was not without difficulty that he obtained permission to return again to Athens, which he did in the following year. In B.C. 357 Dion collected an expedition in Greece for the purpose of liberating Syracuse from the tyranny of Dionysius: among the volunteers who joined this expedition was Speusippus, a nephew of Plato, who had accompanied him on his second journey to Sicily. Dion succeeded in his object, but was soon after murdered (B.C. 353), and with his death Plato's connection with Syracuse ceased.

Plato spent the last years of his life in the diligent prosecution of his philosophical and literary pursuits. Cicero tells us (*De Senect.*, c. 5) that he was actually engaged in writing at the moment of his death. His lectures were at first delivered in the garden of the Academy itself, but afterwards in a garden which he had bought, near the Academy, and between it and the village Colonus. Plato died in Ol. 108, 1 (B.C. 347), and was succeeded as lecturer in the Academy by his nephew Speusippus, though he had left Heracleides of Pontus, another of his disciples, as his deputy there, when he took Speusippus with him on his second journey to Sicily.

The following is the list of his scholars as given by Diogenes of Laërte:—Speusippus, Hippothales, and Callippus of Athens; Xenocrates of Chalcedon; Aristotle of Stagira; Heracleides of Pontus; Philippus of Opus; Hestiæus of Perinthus; Dion of Syracuse; Amyclus of Heracleia; Erastus and Coriscus of Scepsis; Timolaus of Cyzicus; Evæon of Lampsacus; Pithon and Heracleides of Ænus; and Demetrius of Amphipolis; to which list some added the Athenian orators Demosthenes, Hyperides, and Lycurgus, and the philosopher Theophrastus. See also the contradictory lists of tyrants and good statesmen who proceeded from the school of Plato, in Athenæus, xi., p. 508, fol.; and Plutarch, *Adv. Colot.*, p. 1126.

The works of Plato consist of a long series of dialogues, in all of which, excepting the 'Laws,' the principal interlocutor is Socrates. The form of the dialogue was not first introduced by Plato. He is said to have been preceded in that species of composition by Alexamenus of Teos and by Zeno of Elea. Of the former, Aristotle (in the first book of his 'Treatise on Poets,' as quoted by Athenæus, xi., p. 505, C) says, 'We cannot deny the name of discourses and imitations to the mimes of Sophron and to the dialogues of Alexamenus of Teos, which were *the first written of the Socratic dialogues.*' With regard to the statement about Zeno, it must be admitted that it rests upon a very uncertain basis. Diogenes only says, vaguely, '*They say* that Zeno of Elea was the first who wrote dialogues' (διαλόγους τοίνυν φασὶ πρῶτον γράψαι Ζήνωνα τὸν Ἐλεάτην), and Aristotle describes him as 'the answering and questioning Zeno' (ὁ ἀποκρινόμενος καὶ ὁ ἐρωτῶν Ζήνων: *Sophist. Elench.*, c. 10, sec. 2). It is more probable that Plato's adoption of the form of dialogue resulted rather from the nature of the case than from any direct imitation. The spirit of the dialectics of the Eleatic school, with which Plato's philosophy was so strongly imbued, depended mainly on its being in the form of question and answer. The very name 'dialectics' points to this: the word διαλέγεσθαι signifies merely 'to converse,' as appears from the use of the common word dialexis (διάλεξις), 'conversation,' to signify 'dialectics,' in Aristoph., *Nub.*, 317. αἵπερ γνῶμην καὶ διάλεξιν καὶ νοῦν ἡμῖν παρέχουσι; for of course no weight will be attributed to the explanation of the verb which Xenophon puts into the mouth of Socrates (Xen., *Memor.*, iv. 5, sec. 12), an explanation which is obviously derived from its secondary and technical meaning. That Plato then should write in the form of dialogue seems to be the natural consequence of his wish to investigate and analyze, dialectically and after the manner of Socrates, the various questions of philosophy then in vogue. Nor is it at all necessary to suppose that Plato was immediately indebted to any one for the dramatic tone which characterises his dialogues: indications of a real dramatic genius, and of imitative powers of the first class, are scattered so plentifully over all his works, that we cannot fail to recognise everywhere the hand of an artist who copies nature alone. It is not improbable that he studied, and with great profit, both Epicharmus and Sophron: Alcimus, quoted by Diogenes of Laërte (iii. 18), says that he transcribed most of the writings of the former; and according to Quintilian (i. 10, sec. 17), the philosopher was so fond of the mimes of Sophron, that he had a copy of them under his pillow when he died. It seems however likely that he did not become acquainted with the writings of these two authors till his first journey to Magna Græcia and Sicily; and it is certain that several of his dialogues, and some of those in which the dramatic element is most prominent, were composed long before that time, so that he could not have owed anything to them in the first instance.

But though the *form* of Plato's works was not much influenced by his acquaintance with other writers, it is impossible to overlook the fact that, for their *matter, they* were composed with a continual reference to the labours of his predecessors. In fact, Plato's whole system is rather critical and eclectic than dogmatical, and many of his dialogues are rather reviews of the speculations of former philosophers than formal enunciations of any doctrine of his own. The view which he took of philosophy was decidedly a literary one; he was the first of the Greek philosophers who can be considered as a student as well as an expounder of philosophy, as may indeed be inferred from the statement of Heracleides of Pontus, that he was among the first to collect books and import them to Athens. (Proclus, in *Tim.*, i., p. 28; Diog. Laert., viii. 15.) Besides the great ideas and peculiar system of Socrates, which he had learned during his intercourse with that philosopher, Plato was thoroughly conversant with the systems of Pythagoras, Heracleitus, Parmenides, Zeno, Anaxagoras, and Protagoras; his works abound with references to their writings, and some of his dialogues are controversial tracts directed against one or more of these philosophers; nor had he neglected his contemporaries of the Socratic school, some of whom, as Aristippus, Euclid, and Antisthenes, he criticises rather severely. Cicero, in the passage of his treatise 'De Republicâ' (i., c. 10), referred to above, seems to consider that the philosophy of Pythagoras, combined with the dialectics of Socrates, formed the main groundwork of Plato's philosophy: 'On the death of Socrates,' says he, 'Plato first went to Egypt to add to his stock of knowledge, and afterwards travelled to Italy and Sicily in order to learn thoroughly the doctrines of Pythagoras; he had a great deal of intercourse with Archytas of Tarentum and with Timæus the Locrian, and procured the commentaries of Philolaus; and as Pythagoras then enjoyed a great reputation in that part of the world, Plato applied himself to the society of Pythagorean philosophers, and to the study of their system. Accordingly, as he was devotedly attached to Socrates, and wished to put everything into his mouth, he interwove the elegance and subtilty of the Socratic mode of arguing with the obscurity of Pythagoras and the many branches of learning which the Pythagorean philosophy included.' That this is only a partial account of the matter we shall see presently; but Cicero is undoubtedly right in attributing a great deal to the influence of the Pythagorean philosophy on the opinions of Plato. It was from this, no doubt, that Plato was induced to pay so much attention to Epicharmus, who was not only a great comedian, but also a renowned Pythagorean philosopher. (See Clinton's *Fasti Hellenici*, vol. ii., p. xxxvi., note *g*, for the identity of Epicharmus *the philosopher* with Epicharmus *the poet*.) The benefits which Plato derived from a study of Epicharmus are distinctly asserted by Diogenes Laertius (iii. 9-16), and some lines are very pointedly quoted from one of his comedies, in which he prophesies that some future writer would confute and overthrow all opponents by adopting his sayings and clothing them in a different dress. Plato sometimes quotes Epicharmus by name (as in the *Gorgias*, p. 505, D), and in one passage he pays him the high compliment of naming him and Homer as the two chief poets, the one of comedy, the other of tragedy. (*Theætet.*, p. 152, E.) Plato seems to have been also familiar with the works of Empedocles, who stands half-way between the Pythagoreans and the Eleatics, and who, as Mr. Thirlwall suggests (*Hist. of Greece*, ii., p. 139, note), may probably be looked upon as the predecessor of Plato in his eclectic view of philosophy. There is certainly a direct reference to the doctrines of Empedocles in the *Sophistes*, p. 242, D; perhaps also, as Heindorf thinks, in the *Lysis*, p. 214, B, though Stallbaum considers that Anaxagoras is there referred to; and Hermann, in an essay recently published (*Opuscul.*, vol. vii., p. 106), has not hesitated to recognise the very words of Empedocles in a celebrated passage of the *Phædrus*, p. 246, B-C.

On the whole then it is clear that Plato was well acquainted with the labours of his predecessors and contemporaries. But though he may have learned much from them, and though he certainly had borrowed some of his leading views from his great teacher Socrates, we should nevertheless do him great injustice if we regarded him merely as a compiler and systematiser of what had been already advanced, and denied his claim to a place among the originators of great thoughts. Plato's whole system is based upon some grand and novel ideas, which may indeed have been faintly conceived by others, but which were never distinctly uttered and proclaimed till Plato made his appearance. The opposition between the law and the facts, between the general and the particular, between the objects of reflection and the objects of the senses, between the world of intelligence and the visible world, was never clearly pointed out till Plato's time. It is very true that Socrates did awaken the idea of science, and so lay the foundation of dialectics, on which the philosophy of Plato was chiefly built up (see this distinctly stated by Aristotle, *Metaphys.*, xii. 4, § 5); and it is for this reason that Plato has put into the mouth of his master his speculations on this subject. The merit of Plato is that he expressed distinctly and systematically what Socrates only struggled to articulate. The comprehensive view which Plato took of philosophy in all its bearings implied a critical acquaintance with all the branches of his subject and with the works of all his predecessors. From the nature of the case, it was impossible that Socrates should fulfil these previous conditions; he was not and could not have been a literary man, and it does not appear that he was qualified by his character and habits, even if he had possessed the necessary opportunities, to study the systems of other philosophers in an enlightened and critical spirit. The kindred genius of Plato was luckily fostered by every encouraging influence, and he stepped in to elaborate completely the plan of which his master had sketched the rude outline. With many features totally dissimilar, the relation between Socrates and Plato very nearly resembles that between Kepler and Newton; for Kepler's laws stand related to the 'Principia' of Newton much in the same way as the Socratic idea of science does to the dialectical system of Plato. In fact, the case is much the same with every great advance in philosophy; the conception must precede its articulate utterance.

Before we attempt to exhibit the method of Plato's philosophy as it appears in his writings, it will be as well to consider briefly the chronological arrangement of his dialogues, and the natural division according to which they may be classified. Owing to the great admiration in which Plato has been held from his own time down to the present, we have not only a complete collection of his works, but also several dialogues included among them, which, beyond all manner of doubt, were written by some imitators of the great philosopher. Thus, the 'Eryxias' and 'Axiochus' were probably written by Æschines, the Socratic philosopher; the 'Epinomis' by Philip of Opus; and 'The Second Alcibiades' by Xenophon. Leaving out of the question, then, these and other dialogues generally admitted to be spurious, we may divide the genuine dialogues into three classes, which we will arrange in the following chronological order, for reasons most of which have been adduced by Schleiermacher, Ritter, and others, but which our limits will not permit us to enter on in this place. In the first class we would place the dialogues composed by Plato before he set out upon his travels, namely, the 'Lysis,' 'Phædrus,' 'Laches,' 'Hippias major,' 'Protagoras,' 'Charmides,' 'Ion,' 'Meno,' 'Alcibiades I.' 'Euthydemus,' 'Euthyphro,' 'Apology,' and 'Crito.' To the second class we refer those which he wrote after returning from his travels, and before his second journey to Sicily, namely, the 'Gorgias,' 'Theætetus,' 'Sophistes,' 'Politicus,' 'Cratylus,' 'Parmenides,' 'Symposium,' 'Menexenus,' 'Philebus,' 'Phædo,' and perhaps also the 'Republic,' the 'Timæus,' and the 'Critias.' In the third class we place by itself the long dialogue on the 'Laws,' which is but loosely connected with the general system of Plato's works, and seems to be quite an extraneous part of his philosophy. However, notwithstanding this and other dissimilarities, we do not hesitate to recognise in the 'Laws' a genuine work of Plato. It is true that it is the only one of his dialogues in which Socrates does not bear a part; it is true that there is a striking difference of style between the 'Laws' and the other works of Plato; there is in fact a greater difference between the style of the 'Laws' and Plato's ordinary style, than between this last and the style of the epistles, or even than that of the dialogues, which are confessedly spurious; there is a profusion of anacolutha in it to an extent of which we find no example in the other works of Plato: and Ast has objected that the whole plan of the work is inconsistent with Plato's views as developed in the 'Republic.' But with regard to the non-introduction of Socrates, surely no argument of spuriousness can be drawn from this: because Socrates was generally the chief speaker, it was not necessary that he should always be so, and it is probable that the 'Laws' were written with an object totally different from that which Plato generally proposed to himself. With regard to the style, it may be argued, with Cousin, that the 'Laws' had not received the last touches of the author's pen; and it is said that Philippus found the work on the waxen tablets (ἐν κήροις), and copied it out: and with regard to the discrepancies between the 'Laws' and the 'Republic,' Ast seems to have overlooked the distinction which Plato himself has drawn between the two works; for the philosopher says that the second state is not intended to be a perfect one, but only so relatively; besides, the points of discrepancy which have been noticed are not such as to affect any leading principle in Plato's system of ethics; the age fixed for marriage is different in the two works, there is no military caste in the 'Laws,' and the cruel and heartless socialism of the 'Republic' is not mentioned in it: but all these are objections of little weight, and even if they were more difficult to encounter, they would be at once overthrown by the express and positive testimony of Aristotle to the genuineness of the work, and by the internal evidence which must convince every intelligent reader that no man but Plato then living in Greece could have written a treatise at once so comprehensive and so profound. Schleiermacher's arrangement of the works of Plato corresponds in its main features with the one suggested above; it deserves however a separate mention on account of the celebrity of this writer and the important effects which have been produced by his acute and careful examination of the connection of thought running through the dialogues. He also divides them into three classes,—1, elementary dialogues, or those which contain the germs of all that follows, of logic as the instrument of philosophy, and of ideas as its proper object; consequently, of the possibility of the conditions of knowledge; these are the 'Phædrus,' 'Lysis,' 'Protagoras,' 'Laches,' 'Charmides,' 'Euthyphro,' and 'Parmenides,' to which he subjoins, as an appendix, the 'Apologia,' 'Crito,' 'Io,' 'Hippias minor,' 'Hipparchus,' 'Minos,' and 'Alcibiades II.;' 2, progressive dialogues, which treat of the distinction between philosophical and common knowledge in their united application to the two proposed and real sciences, 'Ethics' and 'Physics;' these are the 'Gorgias,' 'Theætetus,' 'Meno,' 'Euthydemus,' 'Cratylus,' 'Sophistes,' 'Politicus,' 'Symposium,' 'Phædo,' and 'Philebus,' with an appendix containing the 'Theages,' 'Erastæ,' 'Alcibiades I.,' 'Menexenus,' 'Hippias major,' and 'Clitophon;' 3, constructive dialogues, in which the practical is completely united with the speculative; these are the 'Republic,' 'Timæus,' and 'Critias,' with an appendix consisting of the 'Laws,' the 'Epistles,' &c. We cannot here enter upon a criticism of this arrangement; we will only remark that we strongly object to Schleiermacher's separation of the 'Theætetus' from the 'Sophistes' and 'Politicus,' which form, with it, a trilogy of dialogues, like the three which are placed together in his third class; and we think that, according to his own principle, as the 'Phædo' is preparatory to the 'Timæus,' and as the 'Philebus,' as an approximate discussion of the idea of the good, is preliminary to the 'Republic,' these two dialogues should occupy the same relative position as the two which they precede. Thus much may suffice for the arrangement of the several dialogues according to some real train of succession. According to their contents, they also form three classes: the Dialectical, Ethical, and Physical dialogues. The formal division of philosophy into these three parts is subsequent to Plato's time, as it was first established by Xenocrates and Aristotle (Sextus Empir., *Adv. Math.*, vii. 16); but Plato certainly had started the idea of such a division, which is distinctly attributed to him by Cicero (*Academ. Post.*, i., c. 5, § 19), and it is clearly discernible in his works, though many of them may not be assignable to any one part in particular: thus the 'Theætetus' and its two connected dialogues are clearly dialectical; the 'Republic' and 'Laws,' ethical; and the 'Timæus,' physical. In endeavouring therefore to give a general view of Plato's philosophical system, we shall adhere to this division, and consider first his views on dialectics, on which his whole system was based, and then his applications of these views to the two provinces of moral and natural philosophy.

I. Plato's system of dialectics is based upon a view of the definition 'real,' which he was the first to bring forwards. The definition, he saw, consists in generalisation and division, i.e. it is made either *per genus* or *per differentiam*. The former process is the base of the second; the second is the development of the former. Consequently, as science, according to Plato, depends upon dialectics, and dialectics on the definition 'real,' in order to general scientific reasoning we must generalise and classify—*κατ' εἴδη σκοπεῖν* and *κατὰ γένος διακρίνειν*. The *ideas* of Plato are, strictly speaking, nothing more than general terms, the main part of the definition 'real,' as Leibnitz calls it, and Plato seems to have constructed his theory of ideas as a mean between the contradictory systems of Heracleitus and the Eleatics. The *Heracleitean* doctrine of a perpetual flux, modified into the dogma of Protagoras, *πάντων μέτρον ἄνθρωπος*,—'The individual man is the standard of all things,'—was directly opposed to Plato's notion of science as based upon an idea or general definition, which is in itself its own ground and authority; for it peremptorily denied *being* (*εἶναι, οὐσία*), and set up in its stead a mere *genesis* or *becoming* (*γίγνεσθαι*), so that nothing could be predicated of any thing as fixed. On the other hand, the *Eleatic* doctrines—1, that all is *one*, and that there is no multiplicity; 2, that all is one immutable being, and that there is no *becoming*, no change, no generation, augmentation, or decay—were equally opposed to Plato's belief in the reality of sensation, for they absolutely denied the *genesis*. Now as Plato was convinced of the reality, both of the permanent being (*οὐσία*), i.e. of the genus signified by the general term, and of the mutable genesis of the phænomena, of the idea as well as of the multiplicity of things, it was necessary that he should form some conception of science which would admit of both. The general science which Plato set forth with this view was called *dialectic*, or the art of conversing, and was based on an examination (the first which had been attempted) of the syntax of the Greek language. In order to make a sentence, to affirm or deny anything, to express a judgment of the mind, it was necessary, he saw, to have at least a *subject* of which something was to be affirmed or denied, and a *predicate* which affirmed or denied something of the subject. This predicate would generally be a verb, but it might be an adjective, as the Greek sentence tolerated an omission of the copula. Words, he says, whether subjects (*ὀνόματα*) or predicates (*ῥήματα*), express neither *entity* (*οὐσία*) nor *action* (*πρᾶξις*), neither *being* nor *becoming*, unless they are joined together in a sentence, and then some tense of *becoming* is predicated of some state of *being*: *δηλοῖ γὰρ ἤδη που τότε περὶ τῶν ὄντων* (the predicates), *ἢ γιγνομένων* (present), *ἢ γεγονότων* (past), *ἢ μελλόντων* (future), *καὶ οὐκ ὀνομάζει μόνον, ἀλλά τι περαίνει συμπλέκων τὰ ῥήματα τοῖς ὀνόμασιν*. (*Sophist.*, p. 262, D.) He speaks here of the mere name of the subject as predicating *being* of it, for we may always predicate *being* of every individual which has a name, in addition to the particular nature which it has (*Sophist.*, p. 251, A); indeed the act of naming or of affixing a general name, the name of the genus, to the individual, is the first step in classification, and in itself gives a fixity to things which is opposed to generation and becoming. (*Theætetus*, p. 157, A.) *Thinking* being the discourse of the soul with itself (*Theætet.*, p. 189, E; *Sophist.*, p. 263, E), and *speech* being a combination of words so as to form discourse for the cognizance of another (*Sophist.*, p. 259, E), thinking is a similar combination of thoughts for the cognizance of a man himself: and thus the science which regulates the combination of thoughts may be called *διαλεκτική*, or the science of discourse. (*Sophist.*, p. 252, E.) It is a science presiding over the faculty which investigates the properties of all sensations. (*Theætet.*, p. 185, B.) This science depends upon definition. Now definition necessarily presumes that some general term should be given, including a multiplicity of objects (*Euthyphr.*, p. 6, D; *Theætet.*, p. 146, D; p. 185, D), and it must then be explained wherein the term to be defined differs from others which belong to the same genus *with* it. (*Euthyphr.*, p. 11, E; *Theætet.*, p. 208, D.) The second process, or the *per differentiam*, is subordinate to the former, which is the all-important one in this science of dialectics.

The great object then of the dialectician is to establish what are those general terms which are the object of the mind when a man thinks. It is clear that they cannot be objects of sense, for these are in a continual state of transition. (*Parmenid.*, p. 152, A.) They must therefore be of the number of those things which we know by means of reflection (*διάνοια*) through the understanding (*λογισμός, νοῦς, νόησις*), for these things being fixed, belong to *οὐσια*, and can become the objects of science or certain knowledge. (*Parmen.*, p. 129, E; *Phæd.*, p. 65, C; *Respubl.* vii., p. 532, A.) Every thing of this kind is an *εἶδος*, that is, a general term. (*Resp.* x., p. 596, A; *Legg.*, x., p. 835-5), or quiddity (*Phædr.*, p. 237, B.) Consequently there is an *idea*, or *εἶδος*, of everything that is called by a general name. Hence the formula for the universal is neither *ἓν* only, as the Eleatics said, nor *πολλά* only, as the Heracleiteans asserted, but *ἓν καὶ πολλά*, 'the one and the many,' i.e. the subject of which many predicates may be asserted, and which therefore appears as manifold. (*Respubl.*, v., p. 476, A; *Sophist.*, p. 251, A; *Parmenid.*, p. 129, E, &c.) From all this it will appear that Plato, like a writer of our own time, regarded philosophy as an undressing of the world, as the means of discovering the certainty and eternity, which are in this world hidden and wrapped up in the garb of the mutable and the temporal. For if the sensible is true, which he maintains against the Eleatics, it is true only through the essence of which it partakes (*Phæd.*, p. 100, C; *Euthydem.*, p. 300, E; *Sympos.*, p. 210, E), and therefore the object of philosophy must be to strip off this garment of the sensible, and ascend to the supreme idea which contains all the subordinate ones, and which has nothing in it capable of being apprehended by the senses, for individual ideas are but hypothetical notions, for which a true ground can only be given by a higher hypothesis. (*Respubl.*, vi., p. 511, B, compared with *Phæd.*, p. 100, A, *Philebus.*, p. 20, D, and *Respubl.*, p. 610, C.) This supreme idea is *God*; and thus God is the common standard of all things, and not the individual man, as Protagoras said. (*Legg.*, iv., p. 716, C.)

Before we pass from this outline of Plato's dialectical system to its application to ethics and physics, it will be advantageous to the reader that he should see how Plato made this application himself. With this view we shall give a sketch of the mode of reasoning which the philosopher has adopted in two most important and interesting dialogues, the 'Gorgias' and 'Theætetus,' which are the counterparts of one another, and which Schleiermacher places at the head of the second class of Plato's works, the dialogues of which occupy a middle position between the elementary and constructive ones, and treat not of the *method* of philosophy, as is the case with dialogues of the first class, but of its *object*. The opposition between these two dialogues has been well pointed out by Schleiermacher, in his introduction to the former of them (p. 5, seqq.). The highest and most general problem of science is to seize upon essence and being while still enveloped in the fleeting and transitory phantasmagoria of the senses, to represent the former as that which is real and good in the latter, and to point out and reconcile the apparent opposition between these two contrasted objects of contemplation. There are two ways of effecting this: the immediate method, or that by which we pass at once from the true to its semblance; the indirect method, or that by which we pass from the feeling of opposition, as a datum, to the primary intention, which forms the starting point in the other case. In the opposition which it is the object of these methods to reconcile, the antithesis is between *being* and *semblance:* in ethics this amounts to the antithesis of *moral good*, in the province of being, to *pleasure*, or *pleasurable feelings*, in the province of semblance; and in physics this is the antithesis of *science*, in the one domain, to *sensation*, in the other. The 'Gorgias' is the development of the former antithesis; the 'Theætetus' of the latter.

The interlocutors in the *Gorgias* are—Gorgias, the celebrated sophist and rhetorician; Polus, a rich and arrogant Agrigentine, who had written a book on rhetoric; and Callicles of Acharnæ, an ambitious demagogue; to whom are opposed Socrates and his friend Chærephon, the latter of whom however takes but little share in the discussion. The business of the dialogue is divided into three parts. I. The refutation of Gorgias with regard to the subject of rhetoric. Gorgias says the subjects of rhetoric are justice and injustice, but that the rhetorician sometimes acts unjustly; 'but,' says Socrates, 'if justice and injustice are the subjects of the rhetorician's art, the rhetorician, as such, must be just always: therefore Gorgias contradicts himself.' II. The refutation of Polus with regard to the distinction between the good or the beautiful, and the pleasant. Polus says, 'to act unjustly has less of the *beautiful* (it is αἴσχιον) than to suffer injury, but the latter has less of the *good* (it is κάκιον) than the former.' Socrates replies, 'the *beautiful* (τὸ καλὸν) excels in pleasure (ἡδονῇ), in utility (ὠφελείᾳ) or in both: the *deformed* (τὸ αἰσχρὸν) is so called from the pain (λύπη) or evil (κακὸν) which attends it, or from both: to act unjustly (τὸ ἀδικεῖν) does not surpass the suffering of an injury (τὸ ἀδικεῖσθαι) in the *pain* which attends it; consequently it must surpass it in the *evil* or *badness* of it, therefore it is both worse (κάκιον), and has also less of the beautiful (τὸ καλόν); and therefore it will not be a reasonable object of preference. Again, it is well for the unjust man to be punished; for the act and the suffering are homologous: now the act of punishing an unjust man is just; therefore the suffering of the unjust man is just also: consequently, as before, it is καλόν; therefore it has some excellence either of pleasure or of profit: but its excellence is not of pleasure; therefore it is profitable for him. III. The refutation of Callicles with regard to the proposition that all *good* is exhausted in the *pleasant*. Callicles asserts that though τὸ ἀδικεῖν has more of deformity than τὸ ἀδικεῖσθαι, this is only by law or convention, and not by nature. For τὸ ἀδικεῖν is an endeavour to get more than others, and this is natural. Socrates first confutes Callicles' idea of a distinction between law and nature (p. 488, B, 489), and then brings three decisive arguments against his position that everything pleasant is good, the first in p. 495, D, the second in p. 495, E—497, D, the third in p. 499, E—499, B. To escape from the consequences of these arguments, Callicles makes a distinction between good and bad pleasures; but Socrates refutes this at once by showing that if we are to make this distinction, it follows that we seek for an object not because it is pleasurable, but because it is good (p. 499, B, 500, A); and then maintains that the rhetoric, or what is the same thing, the political principles of demagogues, like Callicles, are morally bad, for they have *pleasure* for their object, not *good*. Socrates then proceeds by himself to show that happiness consists in justice and order (p. 506-508); that life is not in itself desirable (p. 508-512), and so on: and the dialogue concludes with a fable relating to the state of the soul after death.

The interlocutors in the *Theætetus* are Theodorus, a mathematician of Cyrene, who is represented as attached to the materialism of Protagoras, and a young Athenian named Theætetus, who carries on nearly the whole of the argument with Socrates. The dialogue consists of a refutation of three positions with regard to science (ἐπιστήμη), which are put into the mouth of Theætetus. (I.) That science is sensation (αἴσθησις). This, says Socrates, is much the same as the dogma of Protagoras, 'the individual man is the standard of all things' (πάντων μέτρον ἄνθρωπος); for his φαίνεται, 'it appears,' is equivalent to your αἰσθάνομαι, 'I perceive;' but in this opinion of Protagoras is implied (1) that there is only a *genesis* and no *being*, and that all things are the offspring of flowing and motion; (2) that the objects of the senses have neither an objective nor a subjective existence, but exist only by the concurrence of object and subject: that is to say, according to his principle, τὸ πᾶν κίνησίς ἐστι, 'every thing is motion.' Now, there are two kinds of motion, (1) active, (2) passive; the first comprehends the αἰσθήσεις (perceptions), the second the αἰσθητά (things perceived), and qualities are generated from the concurrence of the percipient and the perceivable. Hence, it follows, according to Protagoras, that nothing *is* of itself, but *comes into being* by the instrumentality of something else (οὐδὲν εἶναι ἓν αὐτὸ καθ' αὑτὸ, ἀλλά τινι ἀεὶ γίγνεσθαι, p. 157, A). Socrates next proceeds to show, in defence of Protagoras, that the objection in respect to dreams and madness is of no force, and that the perceptions of a person mad or asleep are true as far as they go; for, in the first place, we have no means of proving that we are not asleep when we think ourselves awake; and next, it may be shown that, whatever we perceive, we alone perceive it, and that therefore the perception, if it is a perception at all, must be a true one. The opinion of Theætetus, thus far established, is of no validity unless we admit that Protagoras has overthrown his pretensions to superior wisdom by advancing this doctrine. Socrates however concedes that Protagoras might reasonably object to this confutation as not amounting to a regular proof. In the next place then he shows that if perception is science, we arrive at the absurd conclusion that it is possible to remember a thing once known, and yet not to know it. He checks himself however by suggesting (p. 114, C) that this *reductio ad absurdum* has been obtained by an acquiescence in the common acceptations of terms (πρὸς τὰς τῶν ὀνομάτων ὁμολογίας ἀνομολογησάμενοι), and then undertakes to defend the doctrine of Protagoras as far as it will go. Speaking then in the person of Protagoras, he begins by denying that perception (αἴσθησις) and memory (μνήμη) are the same affection (πάθος). Next, he denies that he considers all men alike in wisdom. He says that some opinions may be better than others; but he denies that any are false; and having, in the name of Protagoras, found fault with himself for his mode of arguing, he invites Theodorus to answer him in Protagoras's name. Theodorus having reluctantly consented to do so, Socrates proceeds (p. 170, A) to refute seriously the πάντων μέτρον ἄνθρωπος of Protagoras. In the first place he asserts that almost every action of man implies the belief that there are different degrees of wisdom, and therefore that there is such a thing as false opinion. Next, he shows that Protagoras himself must confess his opinion to be false, if it be conceded that most people think it so, and that all these think rightly. Again, this rule of Protagoras will not apply to the profitable, and this Socrates, after a digression on the difference between the babbling politician and the true philosopher, proceeds (p. 177, C) to prove by showing that the profitable belongs to the *future*, and that no one excepting the man of science can judge of the future as respecting the object of his science. These two last conclusions Theodorus admits to be decisive (p. 179, B, C); but Socrates doubts if the refutation of Protagoras as regards the *present* be made out, unless the Heracleitean doctrine be also refuted. This then is the next step. In the first place he makes Theodorus concede that all things are moved according to both kinds of motion, *i.e.* change of place and change of form. Then alluding to his former distinction of *τὰ ποιοῦντα = τὰ αἰσθητά*, and *τὰ πάσχοντα = τὰ αἰσθανόμενα*, and to what he said about the effects of their concurrence, he shows that, according to this doctrine, no quality can be predicated of anything; and that we neither can be said to perceive, nor yet not to perceive, *i.e.* neither to have science nor to have it not; and hence every proposition is equally right and equally wrong, and nothing is left but the *οὐδ' ὅπως*. To this Socrates adds (p. 184, C) that the senses are the *δι 'οὖ*, not the *ᾧ αἰσθανόμεθα*—the mere instruments, not the causes of sensations; we perceive each sort or quality by a different *δι 'οὖ*, or organ, and consequently must compare them, &c., by some other means than by the senses themselves, *i.e.* the *ψυχὴ αὐτὴ καθ' αὑτήν*, 'the soul considered as unconnected with the senses,' is the subject of essence and truth, and therefore science and sensation are different, for science is not without essence and truth. 'Hence it follows,' says Socrates, 'that we must seek for science in that name, whatever it is, which is given to the soul when it is engaged in abstract speculation.' (p. 187, A.) From this, Theætetus asserts (II.) that science is right conception (*ἡ ἀληθὴς δόξα*), and when he is driven from this, after a series of subtle disquisitions on the nature of false conception, he maintains (III.) that science is right conception combined with reasonable explanation (*ἡ μετὰ λόγου ἀληθὴς δόξα, i.e. ὧν μή ἐστι λόγος, οὐκ ἐπιστητά ἐστι*, p. 201, D). This is discussed with reference to the different meanings of *λόγος*, and the opinion is finally refuted. The dialogue ends with this recapitulation of the results obtained:—'Therefore neither perception nor right conception, nor right conception, combined with reasonable explanation, can be *science*' (*οὔτε ἄρα αἴσθησις οὔτε δόξα ἀληθὴς οὔτε μετὰ ἀληθοῦς δόξης λόγος προσγιγνόμενος ἐπιστήμη ἂν εἴη*).

We have dwelt at some length upon these two dialogues because they furnish a direct transition to Plato's application of his dialectical system to the departments of ethics and physics. The *Gorgias* points out the steps by which Plato would proceed in handling the moral questions of common occurrence in his time; for ethics was always treated in those days as a part of politics, and the sophists, to whom he was opposed, were principally dangerous from the bearing of their doctrines on political morality. The *Theætetus* is a critical review of certain materialistic opinions, which it was necessary to confute before a new system could be fairly set on foot. Plato himself says, 'It is better to do a little well than a great deal in an unsatisfactory manner' (*Theætet.*, p. 187, E); and as Sir C. Wren gained nearly as much credit for the scientific manner in which he removed the ruins of the old St. Paul's church as for the genius and skill with which he planned and constructed the new edifice, so Plato should receive the commendation which is due to him for the elaborate and searching scrutiny to which he subjected the erroneous views current in his time, before he ventured to propound the grand and original conceptions on which his own philosophy was built up.

II. The ethical system of Plato, though traces of his views in this field are discernible in many of his other dialogues, is most fully developed in his two largest treatises, the 'Republic' and the 'Laws,' and most distinctly in the former. From Plato's general plan of considering everything controversially and with reference to the theories of his predecessors, we might draw two conclusions with regard to his system of moral philosophy: 1st, that he would at once discard the notion that the pleasure resulting from sensible impressions could be the highest good, for this would be to allow the influence of the senses to be paramount, the very point in which he was so directly opposed to the Heracleiteans; 2ndly, that he would also reject the claim of knowledge alone to be considered as the good, for that would lead him to coincide, more nearly than would have suited his general views, with the positions of the Eleatics. We see the first germs of his opinions on these two points in the contrast which we have pointed out between the 'Gorgias' and 'Theætetus;' and in the 'Philebus,' which may justly be considered as an introduction to the 'Republic,' he formally confutes the dogma that the *summum bonum* is either pleasure or knowledge alone. The highest good, as is hinted in the 'Philebus,' and distinctly shown in the 'Republic,' is moral virtue: this principle is the basis of man's intellectual and moral constitution; it is his good *quo* man, that is, as far as he is an intellectual and moral agent. Moral virtue, according to Plato, is the subordination of man's lower faculties to his reason as the sovereign faculty: a man is virtuous when the will acts as the servant of the reason in controlling the appetite. When this subordination is perfect in the individual, it constitutes his rectitude, righteousness, justice, or, in general, his virtue or goodness; consequently, his happiness in this world. When a corresponding subordination exists in the state, that is to say, when the guards, or military caste, in perfect subordination to philosophic rulers, assist the reasoning and governing power in regulating and controlling the passions of the populace, the state is a perfect one. The 'Republic' of Plato is a development of this analogy between the ideas of the perfect man and the perfect state. This analogy depends upon the old and well-known division of virtue into the four cardinal virtues, as they are called, namely (1), prudence or wisdom (*φρόνησις*); (2), courage, constancy, or fortitude (*ἀνδρεία*); (3), temperance, discretion, or self-control (*σωφροσύνη*), and (4), justice or righteousness (*δικαιοσύνη*): and on the supposition that the whole province of virtue is exhausted by these four virtues. We cannot agree with Schleiermacher (*Einleitung zum Staat*, p. 26), that 'Plato manifestly took up his description of the four connected virtues only out of respect for the existing classification, just as they had passed in a similar manner from common conventional usage into the philosophy of Socrates.' To us it appears that the classification of the four cardinal virtues is so intimately connected with the very groundwork of Plato's whole physical and dialectical system, that it must have been in the most serious earnest, and with the most deliberate choice, that he assumed this division of virtue as the basis of his moral philosophy. In the 'Republic,' Plato argues thus with regard to the fourfold division of virtue (*De Republ.*, iv., p. 427-434):—The state, being a perfect one, must exhibit in itself the four cardinal virtues; not that every one of its citizens must exhibit them all perfectly: but the philosophic rulers will represent its *φρόνησις*; the courageous standing-army its *ἀνδρεία*; and the well-conducted populace and craftsmen its *σωφροσύνη*. The remaining virtue, *δικαιοσύνη*, is the virtue of the whole; it is the principle and cause of the existence of the other three virtues, compelling each portion of the state to keep to its own business, and to abstain from all *πολυπραγμοσύνη*, or interference with the affairs of the other portions. Passing from the state to the individual, Plato recognises three distinct principles in the soul of man: *τὸ λογιστικόν, τὸ θυμοειδές*, and *τὸ ἐπιθυμητικόν* (p. 439, D): the first belongs to the rational part of the soul; the two last to the irrational part, with this distinction, that the *θυμοειδές*, though it is classed under the same general head with the *ἐπιθυμητικόν*, is very different from it, and often assists the *λογιστικὸν* in governing and controlling the *ἐπιθυμητικόν* (p. 440, A; p. 441, E). These three principles correspond in our philosophical language to the reason, the will, and the appetite. The second is often rendered 'the irascible principle,' and Cicero translated it by *ira* and *iracundia* (*De Republ.*, i. 38); but we follow Hooker, who translates it 'the will,' and Hemsterhuys the younger, who substitutes for it the scholastic synonym *velleité*. These three principles in the soul of man Plato considers to be analogous to the three classes in the perfect state: the philosophic rulers represent the reason, the standing army is the will, and the populace the appetite; and as there was a virtue corresponding to each of the divisions of the perfect state, and also one which ke[illegible] them all together, so, in the righteous or virtuous man, the reason is full of wisdom, the will is strong in fortitude, and the appetite is under the healthy influence of self-control; and all three are kept together by justice, as the musical harmony keeps together the highest, the lowest, and the middle sound, or the octave, the bass, and the fifth (p. 443, D); or, to express the whole in the words which Shakspere has apparently borrowed from Plato (*Hen. V.*, act i., sc 2):—

Exet. While that the armed hand doth fight abroad,
The advised head defends itself at home;
For government, through high, and low, and lower,
Put into parts, doth keep in one concent,
Congreeing in a full and natural close,
Like music.

Cant. Therefore doth heaven divide
The state of man in divers functions,
Setting endeavour in continual motion,
To which is fixed, as an aim or butt,
Obedience.

'This idea of the three principles in the human soul, and of the subordination of the two inferior faculties to the sovereign reason, is most beautifully and clearly worked out in the mythus which forms a prominent part of Plato's earliest dialogue, the 'Phædrus' (p. 246, A, seqq.), where the soul is compared to a charioteer (the reason) driving a pair of winged steeds, one of which is well-bred and well-trained, and the other quite the contrary: the quiet horse (the will) is obedient to the rein, and strives to draw its wilder yoke-fellow (the appetite) along with it, and to induce it to listen to the voice of the charioteer (the reason); but they have both of them much pain and trouble with it, and the whole object of their charioteering is lost if it contrives to get the better of them. In this allegory the aim of the reason in exacting obedience from the lower faculties is not merely this obedience or subordination itself, which constitutes the goodness of man; the reason endeavours, by keeping under control the senses, with all their cravings for gratification, to take a calm view of abstract truth, and to gaze upon the eternal realities which are here clothed in the garb of space and time. This is described as if the soul, in its state of previous existence, went the circuit of the universe in the train of the gods: if, in performing this journey, the reason, or charioteer, could control his restive steed so as to raise his own head above the surface of the heavenly vault, he was borne round with the revolution of the sphere, and, in that position, though struggling and striving with his unruly steed, he saw, however faintly and imperfectly, the essences of things which are collected in that super-celestial region, and the remembrances of which furnish the soul with ideas after it has descended to earth and become united with a body. Now this is carrying the definition of moral excellence, or virtue, one step farther. A man is in a state of virtue, righteousness, or moral excellence, when his will and his appetite are subordinated to his reason; but this subordination is necessary as a previous condition, in order that a man may contemplate the idea of the good; or, in our phraseology, a man must be in a moral state before he can place himself in a religious state. This idea of the good, the real *summum bonum*, the complement of all morality, is discussed in a remarkable passage of the 'Republic' (vi., p. 505, A, seqq.), in which Plato takes up and finishes the argument in the 'Philebus.' It was there shown that the *summum bonum* is not to be sought either in pleasure or in knowledge: it remained to be shown then in what this *summum bonum* actually consists; in other words, what is its *idea*. In the language of Plato, *idea* and *essence* are synonymous. Thus by the idea of the good, he only means the nature and essence of good, or of the sovereign good, that is, of God, and not in this case the abstract and intellectual image which we form of it. In opposition to this idea or essence, Plato uses the term *generation*, or *becoming*, by which he means all sensible things, everything that is born and perishes. Corresponding to this opposition of *generation* to *essence*, Plato, following Parmenides (Simplicius, on Aristotle's *Phys.*, fol. 7, B.), supposed two worlds, the world of matter and the world of mind, the visible and the ideal world; the former being on the model of the latter. Immutable essences, or ideas, are contained in the ideal world. Material essences, or substances, are not real essences, for they are subject to generation and corruption; we cannot predicate *εἶναι* of them; they can only be said *γίγνεσθαι*. Having premised, or rather reminded his readers of this opposition of the *ὁρατὸς τόπος* to the *νοητὸς τόπος* (p. 507, B.), Plato proceeds in the following strain:—The sun is an image of the idea of the good; for while the other senses, such as the hearing, need nothing intermediate or additional in order to the perception of objects, sight, on the other hand, does need the intervention of light, otherwise the colour and the form will not be visible: this light is derived from the sun, and the benefit which our sight derives from the sun is analogous to the benefit which our reason derives from the idea of the good; for as the eye cannot see without the intervention of light, so the reason cannot discern the things of the ideal world without the light of truth. Consequently, the idea of the good is that which imparts truth to the objects of our reason and the power of discerning truth to the reason itself. The idea of the good is therefore far above truth and the knowledge of truth; and as light and the power of seeing are akin to the sun, but not identical with it, so truth and the knowledge of truth are related to the idea of the good, but are not identical with this idea. The sun is also an image of the idea of the good in this, that as the sun not merely enables the eye to see, but likewise supplies nourishment and growth to the visible objects; so the idea of the good not merely enables the reason to discern and know, but likewise gives to the ideas of the reason their being and reality. Accordingly, as the sun, to borrow a phrase from Milton, looks from his sole dominion like the god of this lower world of sense, so the idea of the good, the sovereign good, even God himself, reigns supreme in the higher world of ideas which is cognisable only to the reason. Plato concludes this discussion with a classification which may be considered as a supplement to the negative argument of the *Theætetus*, in the same way as the first part of this disquisition completes the negative argument of the *Philebus*. As there are two provinces or worlds, the ideal and the visible—the world of reason and the world of sense, so there are in each two sorts of essences or substances, namely the pure and the mixed. First, then, the essences or objects of the pure reason are of two sorts: 1, pure, as the ideas of good, beauty, justice, &c.; 2, mixed, or into the conception of which an image necessarily enters: as the idea or essence of a triangle or circle, &c. Secondly, the material substances or objects of sense are also of two sorts: 1, bodies; 2, images, or shadows of bodies. To these four species of objects, four species of knowledge correspond, the two first of which, or those pertaining to the objects of the ideal world, are alone worthy to be called by the name of that *ἐπιστήμη*, or science, which Theætetus sought for in vain.

I. Science (*ἐπιστήμη*).

1, *νόησις*, the knowledge of pure ideas.

2, *διάνοια*, that of mixed ideas.

II. Opinion (*δόξα*).

3, *πίστις*, knowledge of bodies and of what pertains thereto.

4, *εἰκασία*, knowledge of the images or shadows of bodies.

To return however to Plato's ethical system: in this the end is the same as that of his dialectics; from first to last there is a resolute struggle with the domineering pretensions of the senses and a striving after a something higher and holier than this world can furnish. Everything is ascribed to reason and faith: to reason, as the highest faculty of man, to which every other faculty should be subject; to faith, as the evidence of those unseen objects which the reason worshipped and set up in opposition to the *idola* of the senses. From this general explanation it will be seen what is the tendency of such questions as 'whether virtue is capable of being taught?' (Plato's *Meno.*, with the criticism in Aristot., *Ethic. Nicom.*, vi. 13); and it may also be inferred from this that Aristotle has completely misunderstood and misrepresented his master in his criticism of Plato's 'idea of the good.' (*Ethic. Nicom.*, i. 6; *Metaphys.*, xii. 1, seqq.)

It will not be expected that we should here enter upon a minute examination of the political theories which Plato has based upon his ethical system. It will be sufficient to say briefly that Plato's views decidedly tended towards oligarchy, or, as he would have called it, aristocracy. He had a great admiration for Dorian institutions, and a great aversion to democracies, especially to that of Athens. His connection with the chief agents in the oligarchal revolution at Athens may have had some share in this, and it is certainly some proof of the intimate connection between his political opinions and those of the party to which we refer, that the interlocutors in the great trilogy of dialogues, which contains the 'Republic,' the 'Timæus,' and the 'Critias,' are (besides Socrates, whose political character is not altogether without suspicion) the Syracusan Hermocrates, the deadliest foe of Athens, Critias, the head of the thirty tyrants, and Timæus the speculative Locrian legislator. From a set of dialogues managed by such persons as these we should hardly expect anything different in politics from what we find in them; an attempt, namely, to recommend, by argument and fiction, a system of government based upon Dorian and immediately upon Lacedæmonian institutions. There is something eminently unfeeling in the manner in which Plato, after the example of the Lacedæmonians, considers marriage in a gross and physical light, and subordinates all the better sentiments of human nature to the harsh jurisdiction of an uncompromising aristocracy. It has been supposed (by Morgenstern, *Commentat. de Republ. Platonis*, p. 73, seqq.) that one of the later comedies of Aristophanes, the 'Ecclesiazusæ,' is directed against this λακωνομανία of the great philosopher. Stallbaum (*Prolegom. ad Platon. Rempubl.*, p. 68, seqq.) has opposed this conjecture with some chronological arguments, which Meineke (*Histor. Crit. Com. Græc.*, p. 289) does not consider satisfactory. Meineke thinks that Plato's scheme for a community of property and wives is undoubtedly ridiculed in the 'Ecclesiazusæ,' and adduces as an additional argument for this the satirical remarks of Aristophanes upon one Aristyllus (*Eccles.*, 646; Plut., 313), whose name Meineke, following some old grammarians (Eustath., p. 989; *Etym. M.*, p. 142, F), regards as a diminutive form of Aristocles, Plato's original name. We know that in general the Greek comedians were not unwilling to seize upon an opportunity of ridiculing the leader of any philosophical school, and Plato certainly did not escape literary satire of this kind. (Meineke, *Histor. Crit. Com. Græc.*, pp. 238, 240.) Of the *Laws* as related to the *Republic* we have already said as much as seems to be necessary.

III. Plato's physical speculations have less interest for the modern reader than either his dialectics or their application to moral philosophy. In this, as in the other departments, Plato starts with a critical review of the systems which preceded him. The earliest philosophical systems among the Greeks, those namely which we assign to the Ionian school, were solely physical; and they started always from some theory with regard to the origin of things. According to Thales, this primitive element was *water;* according to Anaximenes, it was *air;* according to Heracleitus, it was *fire;* Anaximander considered the world, in its primitive state, as a vast and infinite chaos; Diogenes regarded it as originating in a rational and intelligent principle; and Anaxagoras, uniting in one the views of the two last-named philosophers, recognised a supreme mind (νοῦς) as the principle of life, which imparted motion and form to the material elements, and reduced to order the chaotic mass of primitive atoms. The Eleatic school of philosophy began with the position which thus formed the culminating point of the Ionian school—the admission of a supreme intelligence. According to the Ionians, and in the very language of Thales and Heracleitus, 'All the universe was full of gods.' (Aristot., *De Anima*, i. 5; *De Part. Animal.*, i. 5.) According to the pantheism of the Eleatics, on the contrary, the universe itself was the Deity; in the words of Xenophanes, the one being (τὸ ἓν), the *universe*, was God. (Aristot., *Metaphys.*, i. 5, sec. 12.) 'As Thales saw gods in all things, so it may be said that Xenophanes saw all things in God.' (Thirlwall, *Hist. Gr.*, ii., p. 136.) Parmenides endeavoured to demonstrate this pantheistic view of Xenophanes by arguments deduced from the idea of existence, which denied the possibility of creation and total destruction. In this view he was followed by Empedocles, who also held the doctrine of uncreated and indestructible existence. At an earlier period, Pythagoras had maintained that *numbers* are the principles and essence of all things, and that the world subsists by a numerical harmony, a view which his contemporary and rival, Heracleitus, adopted under a modified form (Plato, *Sympos.*, p. 187, A); and Empedocles, who seems to have combined many views peculiar to the Eleatics with some of the doctrines of Anaxagoras, also, as has been mentioned above, forms the link of connection between the Eleatics and the Pythagoreans. As this was the general state of physical science when Plato wrote, and as he seems to have been always striving to reconcile the contradictory systems of Heracleitus and the Eleatics, and to extract from them their common element of truth, we may see both how Plato would proceed in constructing a theory of the universe, and how this theory would be connected with his dialectical system and his theory of ideas. It is obvious that he would maintain a creation, in opposition to Parmenides and Empedocles, and would oppose himself in this, as in his dialectics, to the perpetual flux of Heracleitus: and this we shall find to have been his method, if we compare the 'Philebus' and the 'Parmenides' with the 'Timæus,' which contains the fullest development of Plato's physical and cosmogonical system. We also observe in the 'Timæus,' and in a celebrated passage of the 'Republic' (viii., *ad init.*), that Plato attached a great weight to the numerical theory of Pythagoras, though we do not know enough of the latter to be able to determine the exact amount of Plato's obligation to him in the musical harmony on which he makes his universe depend, and the complicated numerical relations by which he estimates the durability of his state. In the 'Timæus,' as in everything else, he starts with the opposition of immutable essences to mutable substances, and begins by stating the contrast between the unity of the idea, as real existence, and the multiplicity of things, as only a seeming existence. The latter, according to Plato's system, are treated after the semblance of the former, which is their ἰδέα, or παράδειγμα. In this way of viewing the subject, Plato's physical theory at once assumes the form of a history of the creation, a κοσμοποιΐα, and is therefore in itself, to a certain extent, necessarily mythical. The first great principle (the τὸ ἓν of the later Ionians, which is the τὸ ὂν of the Eleatics) is described as engaged in reducing to order the chaos of material substances. That this must have been done at some time,—that there must have been a beginning to the world (ὁ οὐρανός, ὁ κόσμος, τὸ πᾶν), that the world which we see must have been *created*, for this position Plato argues most distinctly, in opposition to the Eleatics. As the world which we see is within the domain of the senses, it is, for this very reason, one of those things which are liable to generation and decay. It must therefore have had its maker, or δημιουργός. Now this maker can be no other than the formative principle—the *one*, the *existent*. From the beauty, order, and constancy discernible even in this lower world, it is clear, Plato says, that the creator must have constructed it after the model or pattern of a perfect and eternal world (*Timæus*, p. 29, A); and in order that this might be done in the most perfect manner possible, he made it a ζῷον ἔμψυχον ἔννουν τε, 'a living animal, gifted with intelligence' (*Tim.*, p. 30, B), by enduing it with a living soul. The body of this animal was composed of the four elements (and here Plato modifies and combines the theories of Empedocles and Anaxagoras), and the soul of the world was not, as the Eleatic pantheism would have maintained, God himself, but an emanation and product of that intelligence which is the cause of all things. For Plato, both in the 'Timæus' and in the 'Philebus,' speaks distinctly of the *mind* as of the nature of the cause. In the 'Philebus' (p. 27 B, seqq.), after enumerating four kinds of being—the infinite, the limit, the mixture of these two, and the cause—and alluding to the universally received dogma that the mind (νοῦς) is the sovereign of heaven and earth (p. 28, C), he proceeds as follows (p. 29, A):—'We find that fire, water, air, and earth must naturally be in the composition of all bodies. Those elements which we find in individual bodies receive their being from the elements which we find in the universe, and this little body of ours owes its nourishment and all that it has received or possesses to the great body of the world. Now these bodies of ours are animated by souls; and from whence should they derive their souls, if the great body of the universe, which has all the same elements with them, only in far greater purity and perfection, did not possess a soul as our bodies do? Since then we admit in all bodies four sorts of being—the infinite, the limit, the compound of these, and the cause; and since we find in the part of the universe to which we belong that there are causes which create souls, produce health of the body, and effect cures for diseases of the body; and causes which put together other compositions and amend them when impaired,—all of these causes having names which betoken some kind of wisdom or skill;—this being the case, we cannot but think that the whole heaven, possessing the same four sorts of beings, but possessing them pure and undepraved, has for its cause the nature of those things which are most beautiful and noble, a cause which may most justly be called wisdom and mind; and as wisdom and mind cannot be without soul, it follows that the world has a soul and mind from the power of the cause, and that mind is of the nature of the cause of all things.' It should be remarked that Plato distinguished, both in the 'Timæus' and in the 'Philebus,' between the αἰτία, or δι' ὅ (the inducement or moving cause for the creation), and the αἴτιον or ὑφ' οὗ (the efficient cause of the creation). 'The *nature* of that which effects (τὸ ποιοῦν) differs only in name from the moving cause (ἡ αἰτία), and we should be right in identifying that which effects with the efficient cause (τὸ αἴτιον).' (*Phileb.*, p. 26, E.) Now the αἰτία of the creation is the goodness of the creator (*Tim.*, p. 29, E), and its αἴτιον was the universal intelligence. Or as Philo Judæus says (i., p. 162), 'Behold this world! you will find that its efficient cause is God, by whom it was brought into being; its moving cause, the goodness of the creator.' The mind, which thus operates as a cause in setting *bounds* to the *infinite*, and so combining the infinite with the limit, was not the deity himself, but was taken by the deity and placed in the world as its soul. It was a function of the soul which the deity infused into the world, and was akin to the soul existing in each individual man. The great difference between the individual man, ζῷον κατὰ μέρος, and the world out of which he was formed, consisted in the need of organs by the former, whose soul is thus necessarily connected with the faculty of perception (αἴσθησις). So far as the soul of man is connected with perception, it is mortal; it dies with the body of the percipient. But, as the individual body after death unites itself with the great body of the universe from which it sprung, so also the soul, so far as it is not represented by the bodily perceptions, returns to the great soul of the world, of which it is an emanation, and remains undestroyed and indestructible. In this part of the subject, the views on the immortality of the soul, developed in the 'Phædo' (p. 78-80), come to the aid of the physiological investigations in the 'Timæus.' It was a necessary consequence of this way of considering the origin of things, that Plato should maintain the reality of time in opposition to Parmenides. (*Timæus*, p. 37, C, 39, E.) As the multiplicity of things (the πολλά) presumes the universal (the ἕν), and as the bound points to the infinite, so, conversely, there must be time as the image and product—the limitation or bound—of eternity. Thus much may suffice for a general view of Plato's physical theory, for it would not be possible within our narrow limits to enter upon a discussion of his speculations in astronomy and natural history, and of his notions with regard to the origin of evil in general (*Epist.*, ii., p. 313, A), and of diseases in particular (*Tim.*, p. 81-86); and from this the reader will easily see that the method which Plato followed in this department was uniformly consistent with that which he adopted in other fields of inquiry. His object in this, as in everything else, was to discern the one in the many, and, while he demonstrated the existence of the former against the Heracleiteans, to assert the reality of the latter against the Eleatics. This, we have seen, was from first to last Plato's great general object: this idea was the foundation of his dialectic system; it was the guiding-post which directed him to the right end in his moral and physical speculations; it was the clue by which he sought, and seldom sought in vain, for the truths which had eluded the search of all his predecessors.

From this general review of Plato's philosophy, necessarily an imperfect one, the reader has, we hope, formed some estimate of the Catholic spirit of this great writer, and the grand and original conceptions by which he endeavoured to unite in one great system all that was true in the results of previous investigations. Plato was the greatest of all philosophers, because he was the first who adopted a true method, and followed it out in all its bearings and applications. It would not be easy to overrate the influence which Plato's works have exercised upon the speculations of all subsequent inquiries. Although his name has not been so much bandied about for good or for ill as that of his scholar Aristotle, his intellectual empire has been neither less extensive nor less durable. Coleridge has said that all men are born disciples of either Aristotle or Plato (*Table-Talk*, p. 95); a saying which, as far as it goes, is perfectly true. It means that the doctrines which Plato was the first to proclaim to the world, will always be adopted by those who come to the hearing of them, if their minds are akin to his; otherwise, they will have recourse to the modification of those doctrines which was propounded by Aristotle, whose mind was no less repugnant than their own to the spirit of Platonism. There is one field in which the immediate influence of Plato's philosophy has always been most especially active, namely, in Christian theology. Many of the opinions which are stigmatised as heretical may be traced to the Platonism of the early Fathers of the Church, and this is particularly the case with regard to the doctrine of the Trinity. That Plato himself entertained none of the opinions which have been attributed to him on this subject, has been most satisfactorily proved in an able 'Investigation of the Trinity of Plato and of Philo Judæus, and of the effects which an attachment to their writings had upon the the principles and reasonings of the Fathers of the Christian Church,' by Dr. Cæsar Morgan (Lond., 1795).

The Greek text of Plato's works was first established on a careful examination of all the MSS. by Immanuel Bekker (Berlin, 1816-1823). His edition was followed by the very elaborate one of Frederic Ast, the first volume of which appeared in 1819, and which is still in the course of publication. Godfrey Stallbaum, who published a critical edition in 1821-1826, is also engaged upon an elaborate, critical, and explanatory edition of all Plato's works, of which eight volumes have appeared. A complete French translation of Plato has been published by Victor Cousin. Schleiermacher's German translation is unfortunately incomplete, and we have no good English version of Plato's whole works; that by Tayler is far from satisfying the critical reader. Floyer Sydenham's translations are admirable, as far as they go, but this unfortunate scholar was unable to complete more than a very small portion of his design of presenting Plato in an English form. The books which have been written on Plato's philosophical system are very numerous. There is a voluminous work by Tennemann expressly on this subject: it is written too much with a reference to the Kantian philosophy, and, though very learned, appears to us rather heavy and unsatisfactory. Nor can we much recommend Van Heusde's *Initia Philosophiæ Platonicæ*, Traject., 1827, 1831. A good deal may be learned from Ast's *Platons Leben und Schriften*, Leipz., 1816, though the author has advanced some inadmissible paradoxes with regard to the genuineness of a number of works unquestionably written by Plato. There is also much valuable matter in the four books of *Prolegomena* to Stallbaum's edition of the *Parmenides* (Lips., 1839, pp. 4-343). But Plato is, above all others, a writer who must be studied in his own works; no exposition can give an adequate idea of the beauty of his style, or the clearness and cogency of his arguments, and he would escape many of the misrepresentations by which his literary character has been assailed, if his readers were more numerous, and if there were fewer persons to pronounce sentence upon him without having read a syllable of his writings.

PLATON, the celebrated archbishop of Moscow, whose family name was Levshin, was born June 24th, 1737. He was the son of a village priest near Moscow, in the university of which capital he received his education, and, besides studying the classical tongues, made considerable proficiency in the sciences. His talents soon caused him to be noticed, for while yet a student in theology, he was appointed, in 1757, teacher of poetry at the Moscow academy, and in the following year teacher of rhetoric at the seminary of the St. Sergius Lavra, or convent. He shortly afterwards entered the church, became successively hiero-monach, prefect of the seminary, and, in 1762, rector and professor of theology. That same year was marked by an event in his life that greatly contributed to his advancement, for on Catherine II.'s visit to the St. Sergius Lavra, after her coronation, he addressed the empress in a most eloquent discourse, and on another occasion preached before her. So favourable was the impression he made, that he was forthwith appointed court preacher and preceptor in matters of religion to the grand-duke (afterwards the emperor Paul), for whose instruction he drew up his 'Orthodox Faith, or Outlines of Christian Theology,' which is esteemed one of his best and most useful productions. During his residence at Petersburg he very frequently preached before the court, and also delivered on various occasions many of the discourses and orations which are among his printed works. His residence at Petersburg however did not exceed four years, for after being created member of the synod at Moscow, by an imperial order, he was made archbishop of Tver in 1770. His attention to the duties of his new office was assiduous and exemplary; for he not only set about improving the course of study pursued in the various seminaries throughout his diocese, but established a number of minor schools for religious instruction, and drew up two separate treatises, one for the use of the teachers, and the other for their pupils. He was also entrusted with the charge of instructing the princess of Würtemberg-Stuttgard, Maria Pheodorovna, the grand-duke's consort, in the tenets and doctrines of the Greco-Russian church. At the beginning of 1775 he received the empress at Tver, and proceeded with her and the grand-duke to Moscow, where he was advanced to that see, with permission to retain the archimandriteship of the Sergius Lavra. With the exception of some intervals occasioned by his being summoned to Petersburg, where he preached before the court, it was in that convent that he chiefly resided, until he erected another in its vicinity at his own expense, in 1785, called the Bethania. Two years afterwards he was made metropolitan of the Russian church, in which capacity he crowned the emperor Alexander, at Moscow, in 1801, delivering on that occasion a discourse that was translated into several modern languages, besides Latin and Greek. He died in his convent of Bethania, November 11-23, 1812.

His works, printed at different times, amount in all to twenty volumes, containing, besides various other pieces, 595 sermons, discourses, and orations. Many of these are considered masterpieces of style and of eloquence; but, as might be expected among so great a number, all are not equally finished as to manner, or original and impressive as to their subjects. A selection from them, consisting of the finest passages and thoughts was published in two volumes, in 1805.

Dr. Clarke has narrated some particulars of a conversation which he had with the archbishop, which exhibit him somewhat *en deshabille*. Mr. Heber (afterwards bishop of Calcutta), says of him—'This prelate has long been very famous in Russia as a man of ability. His piety has been questioned, but from his conversation we draw a very favourable idea of him. Some of his expressions would have rather singed the whiskers of a very orthodox man, but the frankness and openness of his manners, and the liberality of his sentiments, pleased us highly. His frankness on subjects of politics was remarkable.'

PLATTE, River. [Mississippi, River.]

PLATU'RA. [Viperidæ.]

PLATYCA'RCINUS, Latreille's name for a genus of *Cancerians;* it is the *Cancer* of Leach.

M. Milne Edwards is of opinion that this genus, as well as *Pseudocarcinus* and *Etisus*, approximates very closely to the Crabs (*Cancer*, Linn. and Milne Edwards) and to *Xantho;* indeed they were for a long time united under the same generic appellation. In fact, continues Mr. Edwards, the general form of the *Platycarcini* differs but little from that of *Xantho*.

Generic Character.—Carapace rather convex and very much widened; *front* narrow, nearly horizontal, and divided into many teeth, one of which occupies the median line. The latero-anterior borders of the carapace are divided by fissures into a great number of dentiform lobes; their posterior extremity reaches to the level of the anterior border of the cardiac region, and is continued with an elevated line which surmounts the latero-posterior border. The *internal antennæ*, instead of being bent back obliquely outwards, are turned nearly directly forwards. The *external antennæ* are disposed nearly as in *Etisus*, their basilary joint is very much developed, and is partially lodged in the space between the internal angle of the orbitary border and the front; but the second joint of these appendages, instead of springing near the external border of the first in the internal orbitary canthus, is inserted at a small distance from the antennary fosset, completely out of the orbit; for the rest, it is small, cylindrical, and presents nothing remarkable. The disposition of the pieces of the mouth, of the feet, and of the abdomen is nearly the same as in *Xantho*.

M. Milne Edwards divides the genus into two sections.

A.

Species having the external orbitary angle much more advanced than the neighbouring portion of the latero-anterior border of the carapace.

Example.—*Platycarcinus Pagurus* (*Cancer Mœnas*, Rond.; *Cancer Pagurus*, Linn. and Herbst; *Cancer fimbriatus*, Olivi.).

This is the well known *Black-clawed* or *Edible Crab*, a native of our coasts, and so highly prized for the table. It is the *Tourteau, Poupart, Houvet*, &c. of the French, and *Partan* of the Scotch. [Crab.]

B.

Species having the external orbitary angle more advanced than the neighbouring portion of the latero-anterior border of the *carapace*.

Example, *Platycarcinus irroratus*.

Locality.—The coasts of North America.

M. Milne Edwards divides the *Cancériens* into three great groups:—

1. *Cancériens Cryptopodes*, consisting of the genus *Œthra*. [Œthra.]
2. *Cancériens Arqués*, comprising the genera *Cancer, Carpilius, Zozymus, Lagostoma, Xantho, Chlorodius, Panopeus, Ozius, Pseudocarcinus, Etisus, Platycarcinus* (here treated of), *Pilumnus, Rupellia*, and *Pirimela*.
3. *Cancériens Quadrilatères*, embracing the genera *Eriphia, Trapezia*, and *Melia*.

Such of these forms as our limits permit us to notice are illustrated in this work.

Fossil Cancerians.

For M. Milne Edwards's notice of fossil crabs, see the article Crab, vol. viii., p. 126.

Zozymus also occurs in a fossil state.

PLATYCERCUS. [Psittacidæ.]

PLATYCRINI'TES. [Encrinites, vol. ix., p. 392.]

PLATYDA'CTYLUS. [Gecko, vol. xi., pp. 105, 106.] Mr. Swainson, in his 'Classification of Reptiles,' places the genus under the family *Iguanidæ*, with the following subgenera:—typical, *Platydactylus, Hemidactylus;* aberrant, *Ptilodactylus, Sphærodactylus*, and *Phyllodactylus*. (*Natural History of Fishes, Amphibians*, and *Reptiles*, 1839.)

PLATY'LEPAS, Dr. Leach's name for a genus of *Sessile Cirrhipeds*, whose shell is conical, depressed, consisting of six valves, each divided internally by an angular plate or buttress springing from the centre, and its operculum consisting of four valves in pairs. It differs from *Balanus, Coronula*, and other genera, in the internal structure of the valves. (*Chthalamus* of Blainv.)

PLATY'LOPHUS, Mr. Swainson's name for a genus of conirostral birds arranged by him as a subgenus of *Barita* [Barita], in the subfamily *Corvinæ*, or *Typical Crows*, family *Corvidæ*.

Generic Character.—Bill intermediate in form between *Vanga* and *Garrulus*. Culmen slightly curved; gonys ascending, curved. Front of the head and nostrils defended by stiff setaceous feathers. Nostrils oval, basal. Rictus bearded. Wings rounded; the primaries not much longer than the scapulars. Tail rounded, terminating in setaceous points. Feet moderate. Hinder toe and claw very strong; longer than the middle, which is short; lateral toes equal. Claws acute.

Example, *Platylophus galericulatus* (*Garrulus galericulatus of* Vieill.).

PLATY'MERA, a name given by M. Milne Edwards to a very remarkable genus of *Brachyurous crustaceans*, which is placed by him in the tribe of *Calappians* [Oxystomes], connecting on one side the *Calappæ* [Calappa] and *Mursia*, whilst it is also approximated by other characters to the *Cancerians*. [Crab; Platycarcinus.]

Generic Character.—Carapace very broad, tolerably elliptical, except that on each side it is prolonged into a strong spiniform tooth; its latero-anterior borders are not prolonged above the feet, as in *Calappa*. The *front* is triangular, and disposed as in *Calappa*, &c. The *orbits* are oval, deep, of moderate size; and a fissure may be remarked at the middle of their lower border. The internal and external *antennæ* are disposed nearly as in *Mursia*. The *buccal frame* is much wider anteriorly than in the other genera of the tribe, and the small portion of prelabial space which reaches beyond the external jaw-feet is not divided by a median partition, and is only imperfectly covered by the lamellar prolongations of the internal jaw-feet. The *external jaw-feet* are very wide anteriorly; their third joint, which is as long as the second, terminates by a rather large anterior border, and presents below its anterior and internal angle a great and deep notch, in which is inserted the fourth joint: this last is exposed, and very large, but does not reach the level of the anterior extremity of the third joint. The basilary appendage of these organs, which serves as a valve for closing the afferent apertures of the branchial cavities, is lamellar, very large, and semilunar. The *sternal plastron* is oval. The first pair of feet have nearly the same form and disposition as in the *Calappæ*, but the hands (manus) are longer and less elevated. The succeeding feet are very long and very much compressed; their third joint, or *femur*, is remarkably large and nearly lamellar, and the tarsi are long and styliform. The second pair are rather longer than the second and fourth: the fifth are much shorter than any of the others. The *abdomen* of the male is composed of five distinct joints, the third of which presents behind a very considerable transversal crest.

M. Milne Edwards, who gives the above description, states that he knows nothing of the manners of this genus, and describes one species only—*Platymera Gaudichaudii*, which is of a reddish colour, and three inches (French) in length.

Locality.—The coasts of Chile.

PLATYPUS. [Ornithorhynchus.] N.B. *Platypus* is also Herbst's name for a genus of coleopterous insects (*Bostrichus*, Fab.).

PLATYRHYNCHUS, Desmarest's name for a genus of *Muscicapidæ*. [Muscicapidæ.]

Mr. Swainson remarks that in *Todus* [Muscicapidæ] the bill exhibits a long and boat-shaped appearance, toge ther with a remarkably short tail, and delicate although lengthened legs. These latter characters are, he adds, continued to *Platyrhynchus*, but the bill in the latter has become so short and so broad as to present a miniature resemblance to that of *Eurylaimus* [Muscicapidæ]: the legs are long, but so remarkably slender as to show they are not at all adapted for walking.

Example, *Platyrhynchus cancromus*.

Locality.—Brazil. (*Zool. Ill.*, 1st series, pl. 116.)

Platyrhynchus is also M. F. Cuvier's name for a genus of *Seals*.

PLATY'STERA, a name given by Sir W. Jardine and Mr. Selby to a genus of flycatching birds, arranged by Mr. Swainson as a subgenus of *Todus*. [Muscicapidæ.]

PLATY'STOMA and **PLATY'STOMUS**, Mr. Swainson's name for a genus of the subfamily *Eurylaïminæ*. [Muscicapidæ.]

PLATYU'RUS, Mr. Swainson's name for a genus of Wrens. [Wrens.] But note: *Platyura* is Meigen's name for a genus of dipterous insects.

PLAUEN, one of the most considerable manufacturing towns in the kingdom of Saxony, is situated in a beautiful valley on the banks of the White Elster, 75 miles west-south-west of Dresden. It is in part well built, but suffered severely by a waterspout in 1834. Among the public buildings there are two churches, a royal palace, a lyceum with a seminary for schoolmasters, which is one of the handsomest buildings of the kind in the kingdom of Saxony, two hospitals, and two considerable orphan asylums. The principal church, the interior of which is distinguished by a noble simplicity, has a celebrated altar-piece by Matthæi, representing the Last Supper. The cotton manufactories are of great importance, but said not to be so flourishing as they once were. There are manufactories of stockings, net-lace, bobbin-net, oil-cloth, and extensive brandy distilleries. Plauen is the centre of the manufacture of muslins known by the name of Plauenscher Waare, which gives employment, in the circles of Voigtland (of which Plauen is the capital) and of the Erzgebirge, to 30,000 persons.

Plauen was in the thirteenth century a community of the Teutonic order. The population of Plauen is now nearly 9000.

(Stein; Cannabich; Engelhardt.)

PLAUTUS, MARCUS ACCIUS, was the greatest comic dramatist of Rome. His parents and the time of his birth are unknown, and scarcely anything that has come down to us respecting his personal history is worthy of credit. During the republic the Romans scarcely paid any attention to the personal history of their early poets, and when they began to collect materials for the purpose of writing their lives, they seem to have delighted in making up marvellous tales. It is however generally supposed that Plautus was born at Sarsina, a town in Umbria; and in common with other humourous writers of antiquity, he is described not only as a man of low birth, but of such bodily deformities that nature would seem to have purposely designed to make his countrymen laugh at his person as well as his wit.

It appears that Plautus commenced writing comedies very early, for A. Gellius (iii. 3.14) relates, on the authority of Varro, that after having made some money by his works which he seems to have sold to the ædiles, who had the superintendence of dramatic representations (Prolog. of *Amphitruo*, v. 72), and having embarked it in commercial speculations, he lost it all, and was reduced to poverty. Upon his return to Rome, he entered into the service of a baker, who employed him in grinding his corn by a hand-mill. While he was thus occupied he wrote three comedies, the 'Saturio,' the 'Addictus,' and a third, the name of which was not known to Gellius. Of the first two, only a few fragments are preserved. St. Jerome (in Euseb. *Chron.*, Ol. 145) describes his working in a bakehouse not as the consequence of a failure in commercial undertakings, but of a great scarcity then prevailing at Rome. But these statements, if there be any truth in them, may easily be reconciled by supposing that after he had lost his property, on his return to Rome his distress was increased by scarcity and dearth of provisions. From these isolated accounts we must infer that it was believed among the antients that after he had gained enough to enable him to leave his employer, he continued to live at Rome, devoting his time to his favourite pursuits. Whether he enjoyed the rights of a Roman citizen is not known. The time of his death is differently stated by Cicero and St. Jerome. The latter places his death in Olymp. 145, leaving it uncertain whether it took place in the first or the last year of that Olympiad. Cicero (*Brutus*, c. 15) says that Plautus died during the consulship of P. Claudius and L. Porcius, that is, 184 B.C., or Olymp. 148, 2. So much is certain, that the best period of the life of Plautus was the time immediately before and during the second Punic war.

The plays which then amused his countrymen retained their popularity for several centuries, for we see, from a passage of Arnobius, that the 'Amphitruo' was performed in the reign of Diocletian. It is impossible to ascertain the number of comedies which Plautus wrote, for in the time of Gellius no less than about 130 pieces bore the name of Plautus; most of them however were acknowledged not to be by him, but either, as Varro supposed, the work of one Plautius, or, as seemed more probable to Gellius, plays of earlier Roman dramatists which had been revised and improved by Plautus, and, on account of their similarity in style to his own works, were attributed to him. Many critics and grammarians, according to Gellius, were engaged in endeavouring to ascertain what comedies really belonged to Plautus. Varro, who wrote a work upon the subject entitled 'Quæstiones Plautinæ,' reduced their number to 21, which were designated *Varronianæ*, and which were generally acknowledged to be the real works of Plautus. L. Ælius added four others. Servius (*ad Æneid. I. init*) says that some ascribed to Plautus 20 comedies, others 40, and others 100. Amidst these various statements, it would be hopeless for us to attempt to discover the real number of his comedies, especially as we have no means of comparison, for the twenty comedies still extant were undoubtedly contained among the twenty-one *Varronianæ*, and the names and fragments of the other and doubtful plays are of such a nature that we are unable to draw any conclusions from them. The names of the plays still extant are: 'Amphitruo,' 'Asinaria,' 'Aulularia,' 'Captivi,' 'Curculio,' 'Casina,' 'Cistellaria,' 'Epidicus,' 'Bacchides,' 'Mostellaria,' 'Menaechmi,' 'Miles gloriosus,' 'Mercator,' 'Pseudolus,' 'Poenulus,' 'Persa,' 'Rudens,' 'Stichus,' 'Trinummus,' and 'Truculentus.' The lost play of the twenty-one *Varronianæ* is the 'Vidularia.' The 'Querulus' evidently does not belong to Plautus.

The great number of comedies ascribed to Plautus shows the popularity which his style and manner of treating a subject must have had among his countrymen, and this conclusion is confirmed by the laudatory expressions of the antients themselves. L. Ælius Stilo (Quintil., x. 1) said that if the Muses were to speak Latin, they would adopt the language of Plautus; and Cicero (*De Off.*, i. 29) places Plautus, in respect to the elegance, refinement, liberal feeling, and humour, on an equality with the old Attic comedy. This character is not confined to single passages, but pervades his whole plays. The nature of his humour consists in looking at the bright side of the world in every respect, even under the most unfavourable circumstances. In modern times, with the exception of one or two critics, it is universally agreed that Plautus was one of the first poets of antiquity; and Lessing, to whom we are indebted for the best essay on the life and works of Plautus that has been written in modern times, admits that although he had repeatedly read the 'Captivi' for the purpose of discovering some fault, he never was able to find any, but that, on the contrary, each time he found more reason to admire the play. Horace (*Ad Pisones*, 270) indeed, who was both a sound critic and a great poet, seems to speak with contempt of the verses and the jests of Plautus. But on a close examination of the passage of Horace, it will be found that in reality he only censures his inharmonious verses, and some jests which he thought too coarse for the refined and polished manners of what was called the good society of his own age, which however were a very imperfect standard for estimating the manners described by a dramatist who wrote more than 150 years before him. As for the inharmonious verses of Plautus, they may be excused on this same ground, in addition to which it must be observed that rugged verses and metrical licences in general are much more pardonable in comedy than in any other kind of poetry. But Horace, like Cicero, disliked the early poets of his country.

A question which naturally presents itself with regard to every Roman author is, in what relation did he stand to the Greeks? There is a remarkable passage in Horace (*Epist.* ii.

i, 58, 'Plautus ad exemplar Siculi properare Epicharmi'), which has generally been interpreted as if it implied that Plautus had taken great pains to imitate Epicharmus. But *properare* cannot by any means have this signification: it only expresses the liveliness and rapidity of the dialogue and the action, which are indeed peculiar to the comedies of Plautus; and it must have been this peculiarity in which Horace meant to say that Plautus followed the example of Epicharmus. It is true that we know too little of the works of Epicharmus to prove how far this opinion of Horace is correct; but all we do know of the general character of the Doric poets is in favour of our explanation of the passage of Horace. Moreover we do not find that there existed any similarity either of title or subject between any comedy of Plautus and any one of those of Epicharmus. The old and middle Attic comedies can have served as models to Plautus only in a very general way, as Rome was anything but a proper place for that kind of dramatic poetry; but the new Attic comedy must have exercised a much greater influence upon him, and it is here that we find many plays the titles of which correspond with those of Plautus, though this is no ground for believing that in all instances of this kind he took the Greek drama as his model. The manner in which he treats his characters is one of singular boldness and freedom: they are Greeks, and yet speak and act entirely like Romans; their manners and situations always remind us of Rome: and this is not an accident; but it is evidently the spirit and design of the poet that this impression should be made, for he knew well that the nearer he brought his characters to those of his audience, the greater would be the effect produced; thus Alcmena, in his 'Amphitruo,' is a faithful picture of a Roman matron. Philemon, Diphilus, and Antiphon seem to have been his principal models in single pieces, for some of their plays bore the same or similar titles as some of those of Plautus: others of his plays seem to have had nothing analogous in Greek literature, and may therefore be considered as entirely original. Plautus himself set most value on his 'Epidicus,' as he himself intimates in the 'Bacchides;' and Cicero says that he was particularly partial to the 'Pseudolus' and the 'Truculentus.' But although he has impressed upon all his plays the stamp of his peculiar genius, still there is not one which, in comparison with the rest, does not appear new and striking. His metres are still a matter of great difficulty, but mainly on account of the various readings, and more especially as all the MSS. of Plautus are derived from one which is very corrupt. Some remarks on the subject of the comic metres are given in the article TERENTIUS. A. Mai, in 1815, discovered at Milan a *codex rescriptus*, containing some plays of Plautus, but it is so much mutilated and so illegible, that we cannot hope to derive any considerable benefit from it.

It is well known that there exist a number of spurious scenes in the comedies of Plautus, which, as Niebuhr has shown, were written for the purpose of supplying either actual or imaginary gaps in the original MS. Some of them may be very old and written by skilful hands, but others are very absurd, and betray their modern origin. The scene in the 'Poenulus' which is considered spurious was indeed found by A. Mai in a very old MS. at Milan, but this cannot prove its genuineness, as some of these supplements may have been written even before the fifth century of our æra. Compare the excellent essay of Niebuhr, in his 'Kleine Schriften,' p. 159, ff.

The best among the earlier editions of Plautus are that of Camerarius (Basel, 1558, cum frag. et not. G. Fabricii) and that of J. F. Gronovius (Ludg. Bat., 1664, which was reprinted in 1669, and at Amsterdam in 1684, 2 vols. 8vo.). The recent editions of Bothe (1809-1811, in 4 vols.) and Lindemann are good; the latter especially, who has edited separate plays, has made great progress towards the establishment of a good text. The comedies of Plautus have been translated into almost all the languages of Europe. The Italian literature is very rich in translations of Plautus. Mdme. Dacier published, in 1683, her French translation of the 'Amphitruo,' 'Epidicus,' and 'Rudens.' In 1719 there appeared two complete French translations, the one by Limiers, at Amsterdam, in 10 vols. 8vo., the other by Gueudeville, at Leyden, likewise in 10 vols. 8vo. The Germans have numerous translations of single plays; and there is a translation of all the works of Plautus by Kuffner, published at Vienna, 1806, in 5 vols. 8vo.; and another by G. G. S. Köpke (1809-1820), in 2 vols., which is much better, but not complete. English translations were published, in 1716, by Echard (comprehending the 'Amphitruo,' 'Epidicus,' and 'Rudens'); in 1754, by Cooke; and in 1827, by Cotter. In the last of these translations, which comprehends the 'Aulularia,' 'Epidicus,' 'Menaechmi,' 'Mercator,' 'Pseudolus,' 'Trinummus,' and 'Rudens,' the objectionable passages are omitted. There is an excellent translation by Bonnel Thornton, 'The Comedies of Plautus translated into familiar blank Verse,' Lond., 1767, 2 vols. 8vo. It was continued by Richard Warner, vols. 3 and 4, Lond., 1772, 8vo.; vol. 5, Lond., 1774, 8vo.

PLAYFAIR, JOHN, was born at Benvie in Forfarshire, March 10, 1748. His father was minister of the united parishes of Liff and Benvie, and to him he was indebted for his education till he attained the age of fourteen, when he was sent to the university of St. Andrew. Here he soon became remarkable for his love of study, but more particularly for the rapid progress which he made in mathematics and natural philosophy. There are upon record two proofs of his early proficiency: one consists in the fact that, very few years after his matriculation, Dr. Wilkie, the professor of natural philosophy, finding himself, through indisposition, unable to discharge the duties of his office, delegated them to Playfair. The other is the testimony of George Hill, then a fellow-student of Playfair, and subsequently principal of St. Mary's College, St. Andrew's, who, in a letter to his mother, written during his undergraduateship, and published by his biographer Dr. Cook, very ingenuously observes, 'Playfair has very great merit, and more knowledge and a better judgment than any of his class-fellows. I make *no* exceptions; my parts might be more showy, and the kind of reading to which my inclination led me was calculated to make a better figure at St. Andrew's; but in judgment and understanding I was greatly inferior to him.'

In 1766, when eighteen years old, he distinguished himself as a candidate for the professorship of mathematics in Marishall College, Aberdeen. The examination was a strict one, and lasted eleven days, some say fourteen. The candidates were six in number, of whom two only were judged to have excelled him, namely, the Rev. Dr. Trail, on whom the appointment was conferred, and who attributed his success solely to the disparity of years, and Dr. Hamilton, who subsequently filled the same appointment with much credit.

Upon the death of Dr. Wilkie, in 1772, he offered himself as his successor, but was again unsuccessful; and on this occasion adequate means of determining the relative qualifications of the candidates do not appear to have been resorted to. The same year the responsibility of providing for the support of his mother and her family having devolved upon him by the decease of his father, he considered it his duty to adopt the clerical profession, notwithstanding his intense and growing predilection for scientific pursuits. Having accordingly applied for and obtained the living of Liff and Benvie, he entered, in 1773, upon the duties of his ministry, in the discharge of which and in the education of his younger brethren his time was chiefly occupied during the following nine years. Such a mode of life was not unfavourable to the prosecution of those researches in which he had already engaged with so much avidity. The first fruit of his leisure hours in this respect was a paper communicated to the Royal Society of London, and inserted in their Transactions for the year 1779, 'On the Arithmetic of Impossible Quantities,' which evinced a greater taste for purely analytical investigation than can be conceded to the generality of British mathematicians of that day. The object of the author was to show that 'imaginary expressions are never of use in investigation but when the subject is a property common to the measures both of ratios and angles; that they never lead to any consequences which might not be drawn from the affinity of those measures; and that they are indeed no more than a particular method of tracing that affinity.' (*Works*, iii., p. 28.)

A subject involving difficulties of a higher order had some years previously engaged his attention, while on a visit at Schehallien to witness the experiments of Dr. Maskelyne on the attraction of the mountains in that district, on which occasion he made the acquaintance and acquired the friendship of that astronomer. His investigations upon this subject are contained in his 'Account of the Lithological Survey of Schehallien,' published in the 'London Philosophical Transactions' for 1811.

He resigned his living, in 1782, to superintend the edu cation of the sons of Mr. Ferguson of Raith; and in 1785 he was appointed professor of mathematics, jointly with Dr. Adam Ferguson, in the university of Edinburgh, an appointment previously held by Dugald Stewart. In 1789 he succeeded Dr. Gregory as secretary to the physical class of the Edinburgh Royal Society; and about the same time, owing to the illness of Dr. Robison, the duties of general secretary and the labour of arranging the Society's memoirs for publication devolved chiefly upon him, but the nominal appointment of general secretary was not conferred upon him till the death of Dr. Robison, in 1805, whom he likewise succeeded as professor of natural philosophy in the university of Edinburgh. This obliged him to resign the chair of mathematics, on which occasion the mathematical class expressed their sense of the obligation they were under for his past exertions in their behalf by presenting him with a valuable astronomical circle, now in the observatory of the astronomical institution. The dispute which followed the nomination of Mr. Leslie to the vacant chair has been already noticed under LESLIE.[*] The extreme illiberality of the measures adopted by Mr. Leslie's opponents, and the manifest desire of the clergy to cripple scientific emulation by restricting to their own class appointments totally unconnected with theology, and hitherto filled by laymen with honour and advantage, roused the indignation of Mr. Playfair, who exposed 'the new-sprung zeal for orthodoxy,' in a satirical pamphlet published at Edinburgh in 1806, under the title of a 'Letter to the Author of the Examination of Mr. Stewart's short statement of Facts relative to the Election of Professor Leslie.'

His intimacy with Dr. James Hutton led to his becoming a strenuous supporter of the geological theory which bears his name. His 'Illustrations of the Huttonian Theory of the Earth,' Edin., 1802, 8vo. (*Works*, vol. i.), have been greatly admired for the clearness with which the system itself is there for the first time unfolded, and for the manner in which he examines the several arguments that had been adduced against it; but although, as is remarked by a contributor to the 'Encyclopædia Britannica,' the 'fastidious critics of France' may have acknowledged that 'Mr. Playfair writes as well as Buffon, and reasons incomparably better,' it has justly been a matter of regret that talents such as his should have been employed for so many years upon a subject relative to which the requisite data had not been collected for coming to either useful or satisfactory conclusions. Of the necessity of more extensive observation Mr. Playfair was fully aware; and, besides many journeys undertaken for the purpose of examining the geological features of his own country, immediately after the restoration of peace, in 1815, he set out upon a geological tour through France, Switzerland, and Italy, in search of material for an enlarged edition of his 'Illustrations,' which however other occupations prevented him from maturing for the press.

Shortly after his death, which took place at Edinburgh, 19th of July, 1819, Dugald Stewart, in a letter to Mr. Playfair's nephew and biographer, observes, 'As to those features of his character which are less known to the public, a faithful and perfect resemblance is preserved in the masterly portrait of Mr. Jeffrey, which you will no doubt add to your memoir.' The article here alluded to will be found under the notices of Playfair, in the 'Annual Biography' for 1820, and in the 'Encyclopædia Britannica.' To it we refer the reader, confining ourselves to the extracts which follow. 'He possessed in the highest degree all the characteristics both of a fine and powerful understanding; at once penetrating and vigilant, but more distinguished perhaps by the caution and success of its march than by the brilliancy or rapidity of its movements.' 'As a teacher he took care to imbue the minds of his pupils, from the very commencement of their study, with that relish for the truths it disclosed, and that high sense of the majesty with which they were invested, that predominated in his own bosom, ... and formed them betimes to that clear, masculine, and direct method of investigation by which, with the least labour, the greatest advances might be accomplished.' 'As an author, he wrote slowly; his first sketches were often slight and imperfect, his chief effort and greatest pleasure consisting in their revisal and correction. The outline being complete, he could proceed with the filling in to an almost indefinite extent, enriching and improving as long as he thought fit, without risk of destroying the proportions or injuring the harmony and unity of the design, and without waiting for favourable moments of peculiar alacrity. In his conversation, so far was he from wishing to set off what he had to say by any brilliancy or emphasis of expression, that it seemed generally as if he had studied to disguise the weight and originality of his thoughts under the plainest form of speech and most quiet and indifferent manner; so that the profoundest remarks and subtlest observations were often dropped, not only without any solicitude that their value should be observed, but without any apparent consciousness that they possessed any.'

From the year 1804 he was a frequent contributor to the 'Edinburgh Review,' and most of his articles in that periodical still possess considerable value. They are—1, Review of Mudge's 'Trigonometrical Survey,' v., 1805; 2, Review of Mechain and Delambre, 'Base du Systême Metrique Decimale,' ix., 1807; 3, Review of Laplace, 'Traité de Mecanique Céleste,' xi., 1808; 4, Review of 'Le Compte rendu par l'Institut de France,' xv., 1809; 5, Review of Lambton's 'Indian Survey,' xxi., 1813; 6, Review of Laplace, 'Essai philosophique sur les Probabilités,' xxiii., 1814; 7, Review of Baron de Zach, 'Attraction des Montagnes,' xxvi., 1816; 8, Review of 'Kater on the Pendulum,' xxx., 1818. The whole of these are reprinted in the fourth volume of the collected edition of his works, published at Edinburgh in 1822, in 4 vols. 8vo., to which is prefixed a memoir of the author by Dr. James G. Playfair. To the 'Encyclopædia Britannica' he contributed the articles 'Æpinus' and 'Physical Astronomy,' and an incomplete 'Dissertation on the Progress of Mathematical and Physical Science since the Revival of Letters in Europe' (*Works*, vol. ii.). The proofs of this were under revisal at the time of his death. His contributions to the 'Transactions of the Edinburgh Royal Society' are: 1, 'On the Causes which affect the Accuracy of Barometrical Measurement,' i., 1788 (*Works*, vol. iii.); 2, 'Life of Matthew Stewart,' i., 1788 (*Works*, iv.); 3, 'Remarks on the Astronomy of the Brahmins,' ii., 1790 (*Works*, iii.); 4, 'On the Origin and Investigation of Porisms,' iii., 1794 (*Works*, iii.); 5, 'On the Trigonometry of the Brahmins,' iv., 1798 (*Works*, iii.); 6, 'Theorems relative to the Figure of the Earth,' v., 1805 (*Works*, iii.); 7, 'Biographical Account of the late Dr. James Hutton,' v., 1805 (*Works*, iv.); 8, 'On the Solids of greatest Attraction,' vi., 1809 (*Works*, iii.); 9, 'On the Progress of Heat in spherical Bodies,' vi., 1812 (*Works*, iii.); 10, 'Biographical Account of Dr. John Robison,' viii., 1815 (*Works*, iv.); 11, 'On the Naval Tactics of the late John Clerk, Esq.,' ix., 1821 (*Works*, iii.). His separate works not already mentioned are:—1, 'Elements of Geometry,' Edin., 1795, 8vo.; it contains the first six books of Euclid, the elements of plane and spherical trigonometry, and a supplement on the geometry of solids and the quadrature of the circle, and has passed through four editions since it ceased to be used as a text book in the university of Edinburgh. 2, 'Outlines of Natural Philosophy,' Edin., 1812 and 1816, 2 vols. 8vo. This contains the heads of lectures delivered by the author at the university of Edinburgh. Merely the enunciations of the several propositions and the formulæ as adapted to practical application are given, but reference is made to other works, where the demonstrations will be found. The first volume comprises statics, dynamics, hydrostatics, hydraulics, and pneumatics; the second refers wholly to astronomy; a third volume was contemplated to comprise optics, electricity, and magnetism, but was never executed.

(The collected edition of Playfair's *Works;* the articles 'Playfair' in Brewster's *Cyclopædia* and in the *Encyclopædia Britannica;* the *Annual Biography and Obituary,* 1820, vol. iv., pp. 371-390; Chambers's *Biographical Dictionary of eminent Scotsmen,* vol. iv.)

PLAYHOUSE. [THEATRE.]

PLEA. [PLEADING.]

PLEADING at Common Law. Pleadings are the allegations of the respective parties to a cause expressed in technical language. In order that a correct decision may be made upon disputed rights, it is necessary that the points to be decided should be clearly ascertained, and this is effected by the system of special pleading, by which the precise points in controversy are presented for decision, unencumbered with extraneous matter.

Actions are commenced either by writ or by plaint: by writ, if the court in which the action is brought cannot take cognizance of a complaint without an act of the royal authority in the particular cause; by plaint, if the court is authorised to proceed without royal interference. This writ till lately issued out of chancery, and was called the original writ, by which name it was distinguished from process issued, after the commencement of a cause, by the court which the original writ had authorised to take cognizance of the cause. The original writ or plaint stated the nature of the complaint shortly, though more fully in some forms of actions than in others. After the defendant appeared in court to answer the proceedings against him, he was entitled, within a certain time, to receive from the plaintiff a more detailed statement of the nature of the complaint. This statement was called the declaration, *narratio*, or count, though the last of these terms is now more commonly used to denote one of several distinct matters of complaint comprised in the same declaration.

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[*] In that article the date of Mr. Leslie's promotion to the chair of natural philosophy is incorrectly given; instead of 1809 it ought to have been 1819.

Within a certain number of days, varying according to circumstances, after the delivery of the declaration, the time for pleading arrives; the term 'pleading' being not only used in the extensive sense mentioned above, but also in the limited sense of the answer, whether consisting of statement or of denial, which is made by the defendant to the declaration. In answering the declaration, the defendant is not allowed to accumulate his objections both of law and of fact in one defensive pleading. The peculiarity of our system in referring matters of fact to the decision of an unprofessional tribunal, and of leaving questions of law only to the judges, has created a necessity for separating the matters of law from those of fact, and of presenting the latter in a shape in which they can be readily understood by persons who are not lawyers by profession. It is to the severe analysis required by this feature of our jurisprudence that the system of special pleading is probably indebted for its excellence.

When called upon to plead, the defendant has several courses open to him. First, he may admit the complaint set out in the declaration either by express acknowledgment or by silence. In either case the court pronounces judgment against him: in the former case, upon his cognovit actionem, or confession; in the latter, upon his default, or, as it is termed, by nil dicit, those being the words by which the default of a defendant was formerly recorded. Or, secondly, he may decline to answer the charge contained in the declaration, on the ground that the court has not jurisdiction of the matter; or that the plaintiff is not entitled to sue, as being an outlaw, foreign enemy, or the like; or that the defendant is incapable of being sued, as being an infant, or incapable of being sued alone, as a married woman without her husband, or incapable of being sued alone, as a party to a contract which forms the subject of the action, when he is sued without his co-contractor being made a co-defendant in the action; or that the plaintiff or the defendant is misnamed. This is called pleading in *abatement*, because the defendant prays that the court will abate (put down) or quash the proceedings. Or, thirdly, the defendant admitting, for the present purpose at least, that the facts stated in the declaration are true, may insist that these facts give the plaintiff no cause of action against him; he may accordingly rest (demur) upon the facts as they appear in the declaration, and call upon the court to give judgment in his favour upon that state of facts. This form of pleading is called a 'demurrer.' Or, fourthly, the defendant may answer the complaint, or, as it is technically called, he may 'plead to the action;' and that in one of two ways: he may deny some material allegation in the declaration which is necessary to the maintenance of the action; and, before the rules of pleading promulgated in 1834, he might in a great variety of actions, and those of the most common occurrence, plead one sweeping denial of the whole declaration;—this was called pleading the 'general issue,' which is now permitted in those actions only in which it is expressly authorised by statute, several acts of parliament having allowed defendants who are engaged in carrying into effect some public object to plead the general issue, and under that plea even to enter into matters of defence which are inconsistent with such a denial. A plea denying either one or all of the allegations in the declaration must 'conclude to the country,' that is, the defendant must state his readiness to submit to the decision of a jury (who are called 'the country,' as contradistinguished from the 'court') the truth of the matter of fact asserted in the declaration and denied in the plea. It is the same if the plea asserts a fact denied in the declaration and in either case the defendant is said to *take issue*.

The second mode of 'pleading to the action' is by putting in a 'special plea,' which either expressly, or, according to modern practice, tacitly, admits the truth of the allegations contained in the declaration, but which not only confesses but also avoids them. The special plea (whence the whole system is often called 'special pleading') introduces some new fact or facts, the effect of which, if true, is to show that notwithstanding the facts alleged in the declaration, the plaintiff is not entitled to maintain his action. As it is yet uncertain whether the plaintiff will deny this new matter or will admit it to be true, there can be no conclusion to the country upon such a plea, but the defendant prays the judgment of the court in his favour, in anticipation of the new matter alleged being admitted or proved; and if that new matter contain an affirmative proposition, the defendant must conclude his plea with a verification, that is, an offer to prove it *if* its truth should be controverted on the other side. This is called 'tendering an issue.'

The next pleading on the part of the plaintiff will be regulated by the course pursued by the defendant. If the defendant has confessed the action or made default, the plaintiff has nothing to do but to pray that the court will pronounce a judgment agreeable to the confession, or one consequent upon the default. If the defendant has pleaded in abatement, the plaintiff either acquiesces in the action being quashed, or he demurs to the plea as not showing sufficient matter for quashing the proceedings, or he replies to the plea either by taking issue (*denying*) some material allegation in the plea, or by confessing and avoiding the plea, alleging some matter which, *consistently with* the truth of the plea, destroys its effect and shows that the proceedings ought not to be quashed. If the plaintiff demurs to the plea in abatement, the defendant must either abandon that plea and put in a plea to the action, or he must join in demurrer. If, upon the argument of the demurrer, the court are of opinion that the plea in abatement is good, they give judgment that the proceedings be quashed: if they are of opinion that the plea is bad, the judgment is, that the defendant answer over (quod respondeat ouster), in other words, that he plead to the action.

If the plaintiff take issue upon the plea in abatement, the defendant is bound to join issue, that is, to accept the mode of trial offered, and if upon a trial the issue be found for the defendant, he has judgment that the proceedings be quashed; but if the verdict be for the plaintiff, the judgment is, not that the defendant answer over, but that the plaintiff recover his demand against the defendant.

If the defendant has demurred to the declaration, the plaintiff either abandons the action or he applies to the court for leave to amend his declaration; or he joins in demurrer, asserting that the declaration is sufficient to support the action. This demurrer and joinder form 'an issue in law,' or a question between the parties to be decided by the court after hearing the matter of law argued on both sides.

The plaintiff's answer to the defendant's plea, whether in abatement or in bar, is called a replication. If the defendant has taken issue, by pleading in denial of part or of the whole of the declaration, the plaintiff must join issue, which is done by adding to the defendant's appeal to a jury the words 'and the plaintiff doth the like,' formerly 'et querens inde similiter,' whence this step is called 'adding the similiter.' If the defendant has pleaded specially, the plaintiff may either take issue upon the new matter alleged, and conclude to the country, or he may plead new matter, thus in his turn confessing and avoiding the defendant's plea. Whenever in the course of the pleading in a cause one party takes a proper issue upon an allegation of his adversary, that adversary is bound to join issue and go to trial before a jury; but when, instead of taking issue, new matter is pleaded, the adversary has the option of taking issue upon that new matter, of confessing and avoiding it, or of demurring to it. As the pleadings may thus go on through several more stages, names have been devised for those which most frequently arise. The defendant's answer to the plaintiff's replication is called a rejoinder; the plaintiff's answer to the rejoinder is called a surrejoinder; the defendant's answer to the surrejoinder is a rebutter; and the plaintiff's answer to the rebutter is a surrebutter. The proceedings might go on ad infinitum, but for a very salutary rule which forbids a party from alleging anything inconsistent with, or even not corroborative of, his previous pleading. A violation of this rule is called 'a departure in pleading,' and is attended with fatal consequences to the party guilty of it.

The above is a short and necessarily incomplete sketch of the course of pleading at common law, without defining the strict rules by which the altercations between the parties are carried on, the object of which is to develop the precise points in controversy between parties, and to present them in the most convenient shape for decision. Of these rules Lord Mansfield observes: 'The substantial rules of pleading are founded in strong sense and in the soundest and closest logic, and so appear when well understood and explained; but by being misunderstood and misapplied, are often made use of as instruments of chicane.' The object of most of the new rules of pleading has been to prevent this misapplication as well as to lessen expense, though, as might be expected, in order to avoid an evil practically felt, restrictions have been introduced which are found to be productive of as much inconvenience as that sought to be remedied.

Where a point is raised which is found to consist wholly or principally of matter of fact, the parties, provided there has been a correct application of the rules of special pleading, are distinctly apprised by the pleadings of the exact nature of the question to be decided by a jury, and are thus enabled to direct their attention to that question, and prepare their proofs with reference to that question only. If the point in controversy is found to resolve itself into a question of law, a decision may be obtained by submitting the matter to the opinion of the court after argument upon demurrer, without the trouble, expense, and hazard of a trial before a jury.

We possess very little information as to the mode of pleading before the Conquest. At or soon after that period an important revolution took place. The pleadings in the Aula Regia, and afterwards in the courts which branched out of it, appear to have been conducted vivâ voce in the French language, by Norman advocates called 'cauntours.' After a discussion before the court as to the proper form of pleading [SERJEANTS] before the judges, the pleadings were minuted down by the officers of the court in the form in which they had been finally agreed upon. Thus, little or no inconvenience arose from the prohibition which existed against the making of any alteration in the pleadings after they were entered. In the reign of Edward III. the pleadings were directed to be carried on in English, and the entries of these pleadings to be in Latin. Afterwards a custom was introduced of preparing the pleadings out of court and delivering them to the officers to be entered. In consequence of this arrangement defects in pleadings were not discovered until a period at which the parties were bound by them as being entered, and it became necessary for the legislature to interfere in order to allow amendments to be made in some cases, and in others to direct the judges to pronounce judgment without regard to formal objections. By the late rules all pleadings must be *delivered* by the one party to the other. (Blackstone's *Comm.;* Report of *Comm. Law Commission.*)

PLEADING IN EQUITY. The following remarks may serve to show how far Pleadings in Equity differ from Pleadings at Law, from which they are derived; and they may be taken as supplemental to the article EQUITY, in which a reference is made to this article. Some little repetition can hardly be avoided.

The Answer in Equity differs materially from the answer at Law, in being upon oath, except in the case of persons who have privilege of peerage, and in the case of a corporation; and the plaintiff may use the whole of the defendant's answer as evidence against him at the hearing of the cause, or such integral part of it as he may think proper. He may also, by means of the admissions contained in the answer, obtain the inspection of books, papers, and writings in the defendant's possession, which support his (the plaintiff's claim), and he may use them as evidence at the hearing of the cause. The defendant, except on the question of costs, can make no use of his own answer, further than as showing what his defence is; and he must support this defence by evidence, just in the same way as the plaintiff must prove those parts of his case which he cannot prove by the admissions in the defendant's answer. Any number of plaintiffs may join in a suit, if they have all a common interest, however unequal in value, in the subject-matter of the suit; and a common interest means such a legal or equitable title to the subject-matter of the suit, or to some part of it, as will entitle them to a decree which shall affect the defendants. All the plaintiffs in a suit are considered one, as appears from the general rule that a suit is abated by the death of a plaintiff or the marriage of a female plaintiff; and also from the rule that a person who has no interest in the subject of the suit cannot join as a plaintiff with one who has. But the suit is a different suit against each defendant, for each defendant may answer separately to the bill; and no defendant is affected in any way by the answer of a co-defendant. If a defendant dies, the suit abates as to him, but continues as to the other defendants, though it is nearly always necessary to restore the integrity of the suit by making the personal representative or the heir at law of the deceased defendant a party to it.

The writ of Subpœna is the original process by which a party is brought before the court. This writ formerly required the person to whom it was addressed to appear and answer the complainant's bill under a penalty of 100*l.* The present form of Subpœna requires the person to whom it is addressed to appear and answer 'upon pain of an attachment issuing against his person, and such other process for contempt as the court shall award.' Those who have privilege of peerage are required to appear and answer by a Letter Missive from the lord chancellor.

Every person who files a bill is entitled to have a subpœna, and the person who has been served with such subpœna is bound, within a time fixed by the rules of the court, to demur, plead to, or to answer such bill. The origin of this writ of subpœna, or at least the adoption of it in a court of equity, is usually attributed to John Waltham, bishop of Salisbury, master of the rolls in the reign of Richard II.

The bill is briefly and sufficiently defined to be 'a declaration in writing, showing the plaintifes griefe, and the wrong which he suposeth to bee done unto him by the defendant, and what damages he sustaineth by occasion thereof, praying process against him for redresse of the same.' (West, *Simboleography*, 194, ed. 1622.) 'And first the matter of every bill ought to be true. Secondarily, the same matter ought to be laid down therein plainly and certainly in every circumstance of the thing, person, time, place, manner of doing, and other accidents. And thirdly, the same ought to be sufficient in law, both for the forme thereof, and for the matter, that it be such as is examinable in this court; which being otherwise, may be dismissed thence.' (West.)

A bill then is a declaration in writing of a complainant, or of several complainants who have such a common interest as may form the subject of one suit. Like a declaration at law, it contains the claim of the plaintiff and the grounds thereof. In form it is, as already observed, a petition or supplication: as it commences with words of supplication, so it concludes with a prayer for relief and a prayer of subpœna against the persons from whom the plaintiff claims relief, in order to compel them to appear and answer the bill, and those only are made defendants to the complainant's bill against whom he prays for a subpœna; and all persons who have an interest in the matter of the suit must either be complainants or defendants. This general rule is in practice attended with great difficulty, inasmuch as the word 'interest' is somewhat vague; but it means either a legal or equitable title or claim to that which is the matter of the suit, or to some part of it. In cases of fraud, a person may be a party to a suit, whose only interest in the matter is his liability to pay costs.

According to present practice, a bill has become a much longer declaration than formerly, which is partly owing to the more complicated nature of modern transactions, and partly to other causes. It is divided into various parts by modern writers, but in effect it only contains two parts, the declaration of the grievance and the prayer for relief. The declaration consists of what are technically called Statements and Charges; the statements are or ought to be a clear exposition of the facts on which the plaintiff founds his title to relief; and every fact which is necessary, either by itself or coupled with other facts, to support the plaintiff's prayer, should be sufficiently alleged. This rule, though it may appear vague, and would be useless to any person who attempted to draw a bill without experience in such matters, really contains all that can be said in general terms.

The statements of a bill are usually followed by charges, which are not a mere repetition of the statements, but contain certain things or facts either already stated and alleged in the charges with more particularity for the purpose of obtaining an admission from the defendant, or they contain new facts of which in like manner the plaintiff wishes to obtain an admission as evidence in support of his statement and his prayer for relief. It is also usual in the charges to suggest the defendant's grounds of defence, for the purpose of ascertaining what they are, and generally to make all such charges as, if admitted or proved, would sustain the plaintiff's claim against the defendant. Another object is to discover what defence the defendant will make. But the main purpose of the charges is to obtain from the defendant what is technically called discovery, that is, evidence in support of the plaintiff's claim, either by the admissions in the defendant's answer, or from written papers in the possession or power of the defendant. This is the great distinction in present practice between a declaration at law and a bill in equity. Both state the plaintiff's demand and the foundation of it; but the bill in equity also contains a large part of what, if proved, would be the plaintiff's evidence. Now much of this matter which is charged in a bill may be and often is entirely false, and is invented by the plaintiff for the purpose of seeing whether he cannot extract some evidence favourable to himself from the defendant. The plaintiff may invent or suggest as much false matter as he pleases, but it must be matter of that kind, which, if true, would give him a right to that which he demands of or against the defendant. Now the defendant must answer all that the plaintiff distinctly alleges in his bill, provided it be material to the plaintiff's case, or he must demur or plead to it; and he cannot demur, in the case supposed, because he thereby admits the plaintiff's case to be true, and therefore he must admit that the plaintiff is entitled to the relief which he prays. Thus the plaintiff, by means of the right which he has to compel an answer, incidentally may obtain the discovery, that is, the evidence, which he wishes to have. If the defendant can plead to the bill, he is not bound to answer beyond the plea; for a good plea is a complete answer to the whole bill, or to such part of the bill as it extends to.

The interrogatories, which follow the charges in a bill, are no necessary part of it; but they are added because they are useful in obtaining a more particular answer from the defendant. [Equity.]

'An answer is that which the defendant pleadeth or saith in barre to avoid the plaintiff's bill or action, either by confession and avoiding, or by denying and traversing the material parts thereof.' (West, 194.) Thus it appears that an answer in equity is in form the same as a plea to the action at law. It must be a complete answer to everything sufficiently alleged and charged in the bill, at least to everything that is material to the plaintiff's claim. Formerly, if the defendant made an imperfect answer, 'then, upon demurrer tendered and motion made in court by the plaintiff's counsel, showing the imperfection of such answer, an order will be made that the defendant shall make a better answer by some certain time, and thereupon issueth a subpœna ad faciendum meliorem (sic) responsum.' (West, 187.)

The mode of proceeding in the case of an insufficient answer has been already explained. [Equity.]

A defendant, as already observed, must in proper form and in due time, as prescribed by the rules of the court, answer the bill upon oath, unless he has privilege of peerage, or be a Quaker, or other person who is excused from taking an oath, in which case his statement on honour in the case of those who have privilege of peerage, and in the other case his solemn affirmation, is sufficient. But the plaintiff may consent to take the answer without the defendant's oath or signature, which is sometimes done. Those who are not Christians must swear to the truth of their answer in such form as the religion which they profess declares to be a binding form.

A plaintiff may amend his bill either before answer or after; that is, he may strike out parts and insert new parts; and it is not easy to say what are the limits to the amount of alteration. A defendant cannot alter his answer, it being a statement upon oath, but he is nearly always required, and may always, whether he is required or not, answer the amendments in the bill in such way as he shall think best for his defence.

A demurrer in equity needs little explanation further than what has been given. [Equity.] When it is a demurrer to the whole bill, which is the most usual kind of demurrer, the object generally is to get rid of the suit, and to avoid an answer which may give the plaintiff some discovery. If the demurrer is allowed, the suit is properly at an end; but leave is often given to the plaintiff to amend his bill, particularly where the demurrer is for want of proper parties. If the demurrer is overruled, the plaintiff must answer the bill.

A plea in equity may require a few words of explanation. A plea in bar to the whole bill, which is the common kind of plea, is an averment which is offered as a substantial answer to all the statements and charges in the bill, though it is not in form such an answer. In fact, a plea in equity is the same thing as a plea at law: it is the defendant's answer to the whole of what is adversely alleged, and as it does not in terms answer all that is adversely alleged, it must be taken to admit that to be true which it does not in terms answer, because the averments of the plea are offered as a complete answer to the bill. In the old books there is no distinction made between a plea in equity and an answer in equity; nor is there any difference substantially. 'A plea is a special answer to a bill, differing in this from an answer in the common form, as it demands the judgment of the court in the first instance whether the matter urged by it does not debar the plaintiff from his title to that answer which the bill requires.' (Lord Redesdale, in *Roche* v. *Morgell*, 2 S. and L., p. 724.) Now, as a complete answer is that which the plaintiff requires, and is entitled to if his bill is good in substance and form, and as discovery is in many cases his chief object, and in some cases his only object, it is evident that before any further proceedings can be taken in the matter of a bill to which a defendant pleads, it must be determined whether the plea is good in form: and for this purpose the averments of the plea must be considered as true; and all that part of the bill must also be considered as true to which the plea is no direct answer.

Now, the plea is good in form if it contains averments which either directly negative all the allegations in the bill that give the plaintiff a title to relief against the defendant, or positive averments which destroy the effect of such allegations. The plea is bad in form if the averments of the plea, though true (as on arguing the formal goodness of the plea they are assumed to be), are not a complete answer either by negation or affirmation or both, to all the allegations in the bill which give the plaintiff a title to that which he demands of or against the defendant. The formal badness of such plea is a necessary consequence of the admitted truth of all those parts of the bill to which the averments of the plea do not extend. In order therefore that a plea may be taken as a sufficient answer to the whole bill, it must contain sufficient averments to negative or displace all the allegations in the bill which, if true, give the plaintiff a title to relief. But inasmuch as a plea is an answer, the defendant must, in addition to the averments, give an answer upon oath to all those statements and charges in the bill which, if true, would destroy the effect of the matter pleaded; and this is called supporting a plea by an answer, which is generally necessary. If the plea is decided to be good in form, then the truth of the plea alone is in issue between the plaintiff and defendant, and the cause is heard on the issues so joined; just as, in the case where the bill is answered, the cause is heard upon all the issues of law and fact joined by such bill and answer. If a plea is simply overruled, the defendant must answer the bill. If it is overruled, the answer in support of the plea, if there is one, may serve for an answer as far as it goes, and the court may accordingly order it to stand for an answer to such part of the bill, with liberty to except to it or not, according as it may be an insufficient or sufficient answer to that part of the bill to which it extends.

The matter pleaded as an answer to the bill must be one thing, and such a thing as is an answer to the whole of the plaintiff's demand, or to so much of the bill as the plea extends to. The defendant cannot, according to the rules of equity pleading, plead in bar several and distinct matters, any one of which would be an answer to the bill. But if the averments are averments of separate facts which form one material fact, such averments make a good plea; which is thus expressed by lord Eldon:—'The office of a plea generally is not to deny the equity, but to bring forward a fact which, if true, displaces it; not a single averment, as the averment in this answer, that no bill of sale was executed, but perhaps a series of circumstances forming in their combined result one fact which displaces the equity.' (Lord Eldon, *Rowe* v. *Teed*, 15 Ve., 377.)

The definition of a plea 'not denying the equity, but bringing forward a fact which, if true, displaces it,' is in substance the same as the definition of an exceptio by Gaius (iv. 119):—'Omnes exceptiones in contrarium concipiuntur, quia adfirmat is, cum quo agitur.'

A defendant may disclaim all interest, right, or title in or to the matter of the plaintiff's bill; but it will nearly always happen that such disclaimer will be an insufficient answer by itself, and that there will be parts of the bill to which it will be necessary to give an answer. Accordingly a disclaimer is accompanied by an answer to some part of the bill at least.

A defendant may demur to a part of a bill as well as to the whole bill: he may also plead to a part of a bill as well as to the whole bill; and he may demur, plead, answer, and disclaim, with respect to the same bill. But it is very rare that any two of these ways of pleading are united, except an answer and disclaimer, on account of the practical difficulty attendant on such a mode of defence. For it follows from the nature of these ways of pleading that they must severally apply to substantially different parts of the bill. A man cannot plead to that matter to which he demurs; for to plead is to offer something as an answer sufficient in substance, though it may not be so in form, and to demur is to allege that he ought not to answer. For the same reason he cannot answer, in the formal manner of an answer, to that to which he has either pleaded or demurred, having by pleading already offered something as a sufficient answer, and having by demurrer alleged that he ought not to answer. 'A plea or answer will therefore overrule a demurrer, and an answer a plea; and if a disclaimer and answer are inconsistent, the matter will be taken most strongly against the defendant upon the disclaimer.' (Mitford, p. 320.)

Pleadings in equity were formerly continued, like pleadings at law, beyond the bill and answer. The plaintiff replied to the defendant's answer by his replication, which is defined to be 'the plaintife's speech or answer to the defendant's answer, which must affirm and pursue his bill, and confesse and avoid, denie or traverse the defendant's answer.' (West.) Thus if the answer denied the plaintiff's claim as stated in the bill, and suggested or stated some new matter, it was necessary for the plaintiff to make a special reply which was analogous to the defendant's answer. To meet this special replication, the defendant put in a rejoinder, which is defined to be 'the answer which the defendant maketh to the plaintif's replication, which must pursue and confirm his answer and not swarve from the same, and sufficiently confesse and avoid, denie or traverse each material part of the plaintif's replication. If the parties be not at issue by reason of some new matter disclosed in the defendant's rejoynder that requireth answer, then may the plaintif surrejoyne to the said rejoynder, and the defendant in like manner to the surrejoynder, if there be cause, which hapneth verie seldome.' (West.)

This method of pleading by special replications and rejoinders is now disused, and all the objects of such proceedings are at present attained by the power which the plaintiff has of amending his bill and stating his case in a better form after he has seen the defendant's answer. The disuse of special replications has also led to the practice of frequently stating the plaintiff's case more completely in his bill in the first instance, and introducing numerous charges and suggestions. Thus if the plaintiff anticipates that the defendant may plead to his bill, and so prevent him from obtaining the complete answer which he wishes, he will charge various matters in his bill which will destroy the effect of the anticipated plea, unless the defendant supports his plea by a full answer to such matters.

But whether a bill has been pleaded to or answered, the plaintiff and defendant are not at issue until the plaintiff has filed a replication and served upon the defendant a subpœna to rejoin. This is now merely a formal matter, but t is still necessary in order to put the cause at issue, and to enable the parties to proceed to the examination of witnesses in support of the allegations of their respective pleadings. [Evidence.]

The form of pleading used in this country is derived from hat of the Romans. In Bracton's work, the fifth part, which is entitled 'De Exceptionibus,' occupies the same place in his treatise as the same matter does in the Institutes of Gaius and of Justinian, and the terms used by Bracton are those of the Roman law: indeed, the whole work of Bracton follows the method and order of Justinian's Institutes. A comparison between the Roman and English procedure in equity is made in Gilbert's 'Forum Romanum.'

After the Legis Actiones among the Romans fell into disuse, the mode of procedure was per formulas, the nature of which is fully explained by Gaius (iv. 39, &c.). The Demonstratio was that part of the formula which showed the matter upon which the plaintiff's demand was founded; the Intentio contained the demand; the Adjudicatio gave power to a judex to decide on the matters in dispute; and the Condemnatio empowered him to make a decree in favour of the plaintiff, or to dismiss the defendant, according to the evidence produced before him. The formula was a proceeding in jure, that is, before the prætor, and it contained the instructions to the judex, to whom, according to Roman practice, the investigation of the facts and the ministerial duty of pronouncing the decree were entrusted. The answer of the defendant to the plaintiff's claim was called Exceptio, and exceptiones were either peremptoriæ—in bar, or dilatoriæ—in abatement. The plaintiff might answer the defendant's plea by his Replicatio, and the defendant might answer the Replicatio by a Duplicatio, to which the plaintiff might answer by a Triplicatio; 'and the practice of all such pleadings,' says Gaius (iv. 129), 'has been sometimes carried even farther than this, owing to the multifarious character of the matters in dispute.'

One example may be sufficient as an instance of the Roman pleading. 'If an argentarius sue for the price of a thing sold by public auction, the form of the defendant's plea may be a submission to have judgment against him, provided (si) the thing which was purchased has been delivered to him; and this is a good plea (exceptio). But if the conditions of sale were that there should be no delivery till the money was paid, the argentarius may put in a replication to this effect, submitting to the plea, unless (nisi) the conditions of sale were that the thing should not be delivered to the purchaser before he had paid the money.' (iv. 126.) The words *si* and *nisi*, which are used in this passage, were introduced merely for the purpose of adapting the pleadings for insertion in the formula; for the Condemnatio in the formula was conditional; that is, if so and so is proved, then make such and such a decree against the defendant; and if not proved, dismiss the defendant.

PLECO'TUS. [Cheiroptera, vol. vii., p. 25.]

PLECTRO'PHANES. [Fringillidæ.]

PLECTRO'PHORUS, M. de Férussac's name for a genus of Testaceans which may have been slug-like animals (*Limax*), carrying on their tails, and at a distance from the buckler, a kind of small conical shell; but Cuvier observes that they are only known from the not very authentic figures of Favanne.

PLEBEIAN, PLEBES. [Rome.]

PLEDGE is a thing bailed (delivered for a temporary purpose [Bailment]) as a security to the bailee for the performance of some engagement on the part of the bailor. When the pledge is for a debt, more especially where it is given to secure a loan at interest, it is commonly called a pawn. [Pawnbroker.] In bailments the degree of care required from the bailee varies according to circumstances. When the bailment is for the sole benefit of the bailee, he is bound to use the greatest care, and is excused by nothing but unavoidable accident or irresistible force. When the bailment is for the mutual benefit of bailor and bailee, the latter is bound to take the same care of the thing bailed as a prudent man usually does of his own. When the bailment is for the sole benefit of the bailor, it is sufficient if the bailee keep the goods bailed as carefully as he does his own, however negligent he may be. Different writers on the law of bailments refer the contract of pledge to each of these divisions. Perhaps the conflicting opinions may, to a certain extent, be reconciled by distinguishing between the different objects which the pledge is intended to secure, and the engagements which it is intended to protect. First, the pledge is sometimes, though rarely, given for the sole benefit of the pledgee, as where, after a contract is completely made, one party gives to the other a pledge for its performance. Secondly, which is the ordinary case, the pledge may be for the mutual benefit of bailor and bailee, as in the case of a loan of goods on hire or of money at interest, accompanied by a pawn, in which case the pawn gives security to the bailee, and purchases credit for the bailor. Thirdly, the pledge may be given for the purpose of obtaining a gratuitous loan of goods or of money, or of procuring some other advantage to the bailor only. It would appear that in the first of these three cases the bailee would be liable for the consequences of slight negligence; in the second, for the consequence of the want of ordinary care; and in the third, for gross negligence only.

The pledgee is bound to return the pledge and its increments, if any, upon being requested so to do, after the performance of the engagement. This duty is extinguished if the pledge has ceased to exist by some cause for which the pledgee is not answerable. But he is responsible for all losses and accidents which happen after he has done anything inconsistent with his duty as pledgee, or has refused to do his duty. When the full amount of the debt or duty therefore is tendered and refused, and the pledge is detained, the pledge is at the sole risk of the pledgee: so if the pledgee misuse the pledge. In every case where the pledge has sustained injury from the wrongful act or default of the pledgee, the owner may recover damages to the amount of the injury, in an action on the case. By the act of pledging, the pledgor impliedly warrants that the property is his own, and such as he can rightfully pledge.

The contract of pledge may be extinguished by the performance of the engagement for which the pledge was given, or by satisfying the engagement in any other manner, either in fact or by operation of law, as by the acceptance of a higher security without an express stipulation that the pledge shall continue.

If the engagement, to protect which the pledge is given, be not performed within the stipulated time, the pledgee may sell, upon giving due notice to the pledgor. If no time be stipulated, the pledgee may give notice that he requires a prompt fulfilment of the engagement, upon non-compliance with which he may sell.

The possession of the pledge does not affect the right of the pledgee to enforce performance of the engagement, unless there be a special agreement, by which he has engaged to resort to the pledge only, or to look to it in the first instance.

Though the pledgee may sell, he cannot appropriate the pledge to himself upon the default of the pledgor; nor is he at liberty to use it without the permission of the owner, expressed or clearly implied. Such an implication arises where the article is of a nature to be benefited by or to require being used, in which latter case the use is not only justifiable but indispensable to the discharge of the duty of the pledgee. (*Commentaries on Law of Bailment*, by Storey.)

As to the power of an agent to pledge, see FACTOR.

PLEDGE (Roman). This word formerly denoted a person who was a security for another; but it now denotes a thing which is a security, and generally for a debt.

The chief rules of English law as to mortgaging and pledging are derived from the Roman law, in which however there is no distinction among pledges, dependent on the nature of the thing pledged, whether it was a thing moveable or immoveable, corporeal or incorporeal; and a thing could not be the subject of pledge unless it could be the subject of buying and selling, for the power of selling a pledge was an important part of the creditor's security. A man might pledge a thing either for his own or another person's debt. The terms used in the Roman law to express pledging, and also the thing pledged, are Pignus and Hypotheca. It is properly hypotheca, where there is a bare agreement (nuda conventio) that a thing shall be a security to a creditor for a debt, and the thing remains in the possession of the debtor. The word hypotheca (ὑποθήκη) is Greek, and denotes a thing subjected to a claim or demand. When the thing was delivered to the creditor, it was called Pignus (Isid., *Orig.*, v., c. 25); and as moveable things would for obvious reasons be most frequently delivered, a notion got established among some Roman lawyers, aided by an absurd etymology (pignus appellatum à pugno, *Dig.*, 50, tit. 16, s. 238), that the term pignus was applicable only to a pledge of moveable things; and this notion has also prevailed in modern times. (Ryall *v.* Rowles, 1 Vez.) The true etymology of pignus seems to be the same as that of pactum. It is generally said that hypotheca corresponds to the English mortgage, and pignus to pawn or pledge; but this is not the case. No ownership was transferred by the Roman hypotheca. The term hypothecation in English law is still used to express the mortgage of a ship or its cargo.

Originally, when a man wished to borrow money on the security of a thing, he transferred the ownership of the thing to the lender by mancipatio, or in jure cessio, sub lege remancipationis, or sub fiducia; and the borrower could recover his ownership by usureceptio (Gaius, ii. 59, &c.) when the debt was paid, and in some other cases also. But this mode of giving security was found to be disadvantageous to the debtor, and subsequently the thing was merely put into the hands of the creditor with a power of sale in case the debt was not paid according to the agreement; but this gave the creditor no ownership, and consequently he had no actio in rem against any third person, and therefore no sufficient security for his debt. The prætor's edict found a remedy for this by giving to the creditor a real action, called serviana actio, against any person who was in possession of the thing pledged, for the purpose of recovering it; and the extension of this right of action, under the name of the quasi-serviana actio, also called hypothecaria, gave to the hypotheca the full character of the pignus.

Thus the Roman law recognised the pignus, which arose from the contractus pignoris, and the hypotheca, which arose from the pactum hypothecæ. But there were other cases which in the Roman law were considered cases of pignus.

The pignus praetorium arose when a creditor, by a judicial decree, was allowed to enter into possession (mittebatur in possessionem) either of the whole property of a debtor or any part of it; but there was no pignus till the creditor took possession. It has been conjectured that this kind of pignus owes its origin to the old pignoris capio. (Gaius, iv. 26, &c.)

There was also the tacit hypotheca, which was founded on certain acts. In the case of prædia rustica, the fruits of the ground were a pignus to the owner for the rent, even if there was no agreement to that effect; and if a man lent money for the repairs of a house, the building became a pignus for the debt.

The creditor, though in possession of the pledge, could not use it or take the profits of it without a contract to that effect, which was called antechresis, or mutual use. If he took the profits, he had to render an account of them when his debtor came to a settlement with him; but he was entitled to an allowance for all necessary expenses laid out on the thing pledged, as, for instance, for the repairs of a house.

After the time agreed on for payment was passed, the creditor had the right of selling the pledge and of retaining his debt out of the produce of the sale. If the produce of the sale was not sufficient to discharge the debt, he had a personal action against the debtor for the remainder. Originally perhaps he could only have this right of sale by express contract, but subsequently the right to sell (jus distrahendi sive vendendi) was an essential part of the contract of pledge. Though the creditor was not the owner of the thing (dominus), still he could transfer ownership to the purchaser, a doctrine that is only intelligible on the supposition that he sold it as the attorney or agent of the debtor. But the creditor could only sell the thing in respect of the debt for which the thing was pledged, and not in respect of other debts due to him from the debtor, though he might apparently retain the surplus of the sale in his hands as a satisfaction for such other debts. The power of sale was to be exercised pursuant to the terms of the contract; and when there was no agreement as to the form and manner of sale, the law prescribed the mode of proceeding, which the creditor was bound to observe strictly. It was once usual to insert in the contract of pledge a Lex Commissoria, that is, a condition by virtue of which the thing pledged became the absolute property of the creditor, if the money was not paid at the time agreed on. But by a constitution of Constantine (*Cod.*, viii., tit. 35) it was forbidden to insert such a clause in the contract. If anything remained over after satisfying the creditor, it belonged to the debtor.

A thing might be pledged to several persons in succession, whose claims were to be satisfied according to their priority in time. But there were some exceptions to this rule introduced by special laws, which gave a preference to certain persons and claims, independent of the order of time; and a constitution of Leo gave a priority to a pledge which was contracted by a public instrument (instrumentum publice confectum), or by a private instrument attested by three witnesses, over every other pledge which was to be proved by any other evidence. This law was intended to prevent fraudulent agreements by which a pledge would be antedated.

Where there were several creditors, he who had the priority over all was entitled to sell and pay himself; the surplus, if any, belonged to the creditor who was next in order, and so on till the whole was exhausted. If a creditor who was posterior in order of time, wished to stand in the place of him who had the priority, he could do so by paying him his debt, and he then occupied (successit) the same place and had the same right as the prior creditor. This doctrine was founded on the assignable character of a pledge, for though the pledgee was not the owner of the thing, and could only sell it in the manner already mentioned, he could transfer his interest to an assignee, and could even transfer to a second pledger the jus vendendi when the second pledger was excluded from such right by special contract. (*Dig.*, 20, tit. 3, s. 3.) When a subsequent creditor advanced a sum of money which was applied to the preservation of the thing pledged, for instance, for the purpose of repairing a ship, he had a priority over creditors of earlier date, on the ground of his having by his loan secured the thing. (*Dig.*, 20, tit. 4, s. 5.) The same rule, perhaps somewhat more limited, prevails in our own law as to money lent on the security of a ship.

As the pledger remained the owner of the thing pledged, he could of course sell it, but the purchaser took it subject to the pledge. The creditor who was in possession of a pledge was answerable for any damage that befel it owing to dolus or culpa, that is, fraud or neglect, but he was not answerable for unavoidable loss.

A pledge was determined in various ways; by the destruction of the thing, by the creditor releasing the debtor, by the debtor paying the debt, and in other ways. When the debtor offered the money to his creditor, he was entitled to have the pledge restored to him. This might be obtained by an actio pignoraticia, which was an actio in personam, and also lay for damages done to or sustained by the thing, or for the surplus of the money if the pledge had been sold by the creditor. The creditor had a contraria pignoraticia actio against the debtor for expenses incurred as to the pledge, for any fraud in the matter of the pledge, as passing off base for better metal, and in some other cases.

The Roman law of pledges has been treated by various writers at great length. A compendious view of it is contained in Brinkmann's 'Institutiones Juris Romani,' Slesvici, 1822; in Marezoll, 'Lehrbuch der Instit. des Röm. Rechtes,' Leipzig, 1839; and in Ayliffe's 'Law of Pledges or Pawns,' London, 1732; see also 'Dig.,' 20, tit. 1, &c.; 13, tit. 7; 'Instit.,' iv., tit. 6; 'Cod.,' 8, tit. 14, &c.

PLEDGING, CUSTOM OF, derived from the French *pleige*, a surety or gage. The expression 'I'll pledge you,' in drinking, is deduced by some of our writers on popular antiquities from the times when the Danes were in possession of England. It is said to have been the custom of that people to seize the moment when a native of the island was in the act of drinking, to stab him with a knife or dagger; whence people could not drink in company unless some one present would be their pledge or surety that they should receive no harm. (Brompton; Sir Richard Baker's *Chron.*, edit. 1670, p. 316; Henry, *Hist. Great Brit.*, 4to., vol. ii., p. 539: see also Eric Pontoppidan's *Gesta et Vestigia Danorum extra Daniam*, vol. ii., p. 209.)

Others state the custom to have taken rise from the death of King Edward the Martyr, son to Edgar, who, by the contrivance of his step-mother Elfrida, was stabbed in the back as he was drinking.

Brand thought the expression meant no more than that if you took your cup or glass, I *pledged myself to you* that I would follow your example. (Brand's *Popular Antiquities*, vol. ii., pp. 223-232.)

PLEI'ADES. [TAURUS.]

PLEIOCENE, or PLIOCENE. By this title (derived from *πλεῖον*, *more*, and *καινός*, *new*) Mr. Lyell wishes to characterise the upper part of the tertiary strata. There are in his view older and newer Pleiocene formations, and some have used for the latter class the expression Pleistocene, or *most* new.

PLEI'ODON, Conrad's name for the genus *Iridina* of Lamarck. [NAIADES.]

PLEI'ONE, Savigny's name for a genus of *Dorsibranchiata* (*Amphinome*, Bl.), which, with the same tentacles as *Chloeia*, Sav., have branchiæ in the form of tufts.

Locality.—The Indian Seas, where some of them grow to a large size.

Example, *Pleione caruncula*ta (*Terebella carunculata*, Gm.)

PLEKOCHE'ILUS, the Rev. Lansdown Guilding's name for a genus of *Pupadæ* (Guild.), *Bulimus* of authors.

Generic Character.—*Animal* hermaphrodite. Body corrugate, heliciform; *head* bilobate; *tentacles* four, the two longer ones with oculiferous terminations; *mandible* very lunate, the ossicula transverse, the triangular appendage cutaneous. *Intromittent organ* retractile, at the root of the right greater tentacle. *Mantle* perforated by a common foramen. *Ova* few, large, with a calcareous shell or crust.

Shell barely umbilicate, dextral, oval, spiral; the spire elevated, but obtuse, the two last whorls largest, ventricose. *Aperture* entire, elongated. *Columella* with a single plait, which is cavernoso-inflex. *Lip* thickened, marginate. (Guild.)

Example, *Plekocheilus undulatus*.

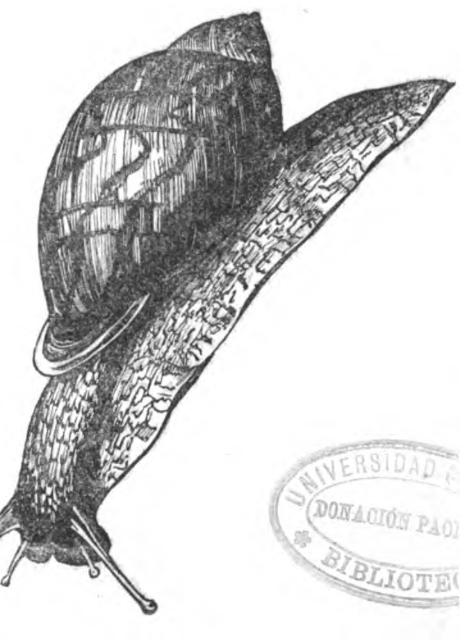
Description.—Body olivaceous-black, foot pallid beneath; tentacles white at the apex; eyes black.

Shell stout, turgid, plaited longitudinally, indistinctly striated transversely, ferruginous chestnut, with oblique brown undulated bands; whorls five.

Eggs oval-elliptic, indistinctly corroded, numerous, large, glutinously deposited in a heap, and joined by a gelatinous thread; at first yellowish, shining, afterwards (when dry) pearly-calcareous.

Young pallid, the shell diaphanous, prettily corroded, and of a silky lustre, no striæ, and the lips simple. The *adolescent shell* subdiaphanous, the bands more distinct. The *old shell* covered with a glaucous-brown, thick wrinkled epidermis, the bands evanescent, often deeply corroded. (Guild.)

Mr. Guilding states that this fine species occurs in immense numbers in the forests of the island of St. Vincent, generally withdrawn, but sometimes even copulating in the day-time. The ova are agglutinated to the vaginating leaves of the *Tillandsiæ*, which, from holding water, secure a damp atmosphere at all times. The lately excluded shell long stood in Mr. Guilding's cabinet as a nondescript *Succinea?* with a depressed spire. He at last traced it *ab ovo*, and from the examination of this and the young shell of *Bulinulus undulatus*, he cautions the zoologist against hastily separating such small shells as do not bear on the lip some positive mark of maturity. In the young *Plekocheili*, he observes, the whole shell is without striæ, and is beautifully corroded on its surface, the plicæ being smooth and distinctly marked as they are added by the first operations of the mantle. In the young of the other snail, he observes, are seen numerous fine longitudinal and transverse striæ, which it will be in vain to look for in the parts added by the animal as it advances in strength, a circumstance that would have led to the multiplication of species, had not specimens been discovered in various stages (*Zool. Journ.*, vol. iii.)



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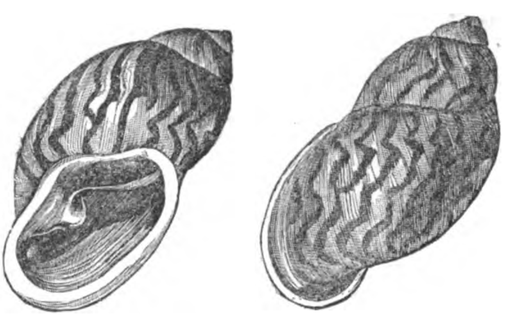
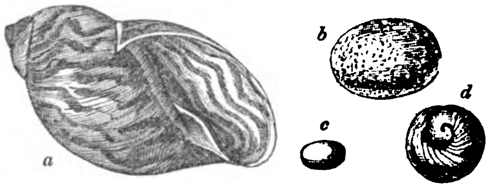
Plekocheilus undulatus, animal and shell. (Swainson, from Guilding's drawing.)



Shell of Plekocheilus undulatus.



a, young shell of same; *b*, egg magnified; *c*, natural size; *d*, apex of nucleus enlarged.

PLENIPOTENTIARY. [AMBASSADOR.]

PLEODONTS, the name assigned by MM. Duméril and Bibron to their first subfamily of *Lézards Lacertiens* (Lacertian Lizards), or *Sauriens Autosaures* (Autosaurian Saurians).

The *Pleodonts* are divided into two great groups: the first with a compressed tail, surmounted with crests, as in the *Crocodiles;* the other with the tail perfectly conical, or very slightly flattened on its four surfaces, so that it still appears rounded. MM. Duméril and Bibron have employed the expression *Cyclotetragonal* to designate this mixed form.

In the subfamily of the Pleodonts these distinguished zoologists have placed the species whose teeth are completely solid, being without any internal cavity, and very firmly fixed by their edges and their external surface to the jawbones, in a groove hollowed out along their internal border, against which the teeth, especially the anterior ones, are so applied, that their point or free extremity seems to be always a little directed outwards.

In the first group of the *Pleodonts*, or *Lacertians with compressed tails* (*Cathétures*), three genera only are comprised—1. *Crocodilurus* (*Dragonne*, part, Cuvier; *Ada*, part, Gray). 2. *Thorictes*, Wagl. (*Dracæna*, Daud.; *Ada*, part, Gray). 3. *Neusticurus*, Dum. and Bib.

In the second group of *Pleodonts*, those with compressed tails (*Conicaudes*, or *Strongylures*), the following genera are included:—1. *Aporomera*, Dum. and Bib. 2. *Salvator*, Dum. and Bib. (*Tupinambis*, Daud., part, the *Sauvegardes*, or *Monitors*, Cuv.; *Tejus*, Merrem, part; *Custa*, Fleming; *Monitor*, Fitzing.; *Podinema* and *Ctenodon*, Wagl., Wiegm.; *Exypneustes*, Kaup.; *Podinema*, C. Bonap.; *Tejus* (subgenus *Teguixin*, Gray). 3. *Ameiva* (*Ameiva*, Cuv., part, Fitzing.; *Tejus*, part, Merrem; *Cnemidophorus*, part, Wiegm., Bonap.; *Tejus* (subdiv. *Ameiva*, part, Gray). 4. *Cnemidophorus*, Wagl. (*Ameiva*, part, Cuv., Fitzing., Gray; *Cnemidophorus*, part, Wagl., Wiegm.). 5. *Dicrodon*, Dum. and Bib. 6. *Acrantus*, Wagl. (*Tejus*, part, Merrem; *Tejus*, Fitzing.; *Acrantus*, Wagl., Wiegm.). 7. *Centropyx*, Spix (*Trachygaster*, Wagl.; *Pseudo-Ameiva*, Fitzing.).

PLESIOSA'URUS, the Rev. W. D. Conybeare's name for an extinct genus of an extinct family, the *Enaliosaurians*, and first described by him, with the assistance of Mr. De la Beche, in the *Transactions of the Geological Society of London*, in 1821.[*] A restoration of the skeleton, together with that of *Ichthyosaurus*, was given by Mr. Conybeare in a subsequent volume of the same *Transactions*[†] (1824), from an almost perfect specimen of *Plesiosaurus dolichodeirus*, and the accuracy of this restoration is still universally acknowledged. This genus is the *Halidracon* of Wagler.

Since the article Ichthyosaurus was written, Professor Owen has made that part of his *Report on British Fossil Reptiles* which relates to the *Enaliosauria*, or 'Lizards of the Sea,' to the *British Association for the Advancement of Science*. This paper, which adds another to the many instances already before the public of the Professor's diligent research and acute observation, has brought the history of the *Ichthyosauri* and *Plesiosauri* down to the present day, throwing light upon many points which required elucidation, and completing the catalogue of the species of both genera, after he had visited the museums of this country and of the Continent.

Professor Owen characterises the *Enaliosaurians* as vertebrate, air-breathing, and cold-blooded animals; referrible therefore to the great class of *Reptilia* in the Cuvierian system, and indicative of a primary modification of the typical structure of that class, by which the Enaliosaurs were fitted more especially for a marine life. The proof that these animals respired atmospheric air immediately, is, he observes, afforded by the position and structure of the nasal passages, and by the osseous mechanism of the thoracic-abdominal cavity, whilst the evidence that they were cold-blooded animals reposes on the unanchylosed condition of the elementary osseous pieces of the occiput and other cranial bones, of the lower jaw, and of the vertebral column: the laws of organic coexistence justify the conclusions, to which the Professor comes from these conditions of the osseous system, that the heart was adapted to transmit only a part of the circulating blood through the respiratory organs. He then shows that the peculiar modifications of the Saurian type, or the special Enaliosaurian characteristics, consist in the absence of the ball and socket articulations of the bodies of the vertebræ,—the position of the nostrils at or near the summit of the head; their separated hæmapophyses;[*] the numerous short and flat digital bones, which must have been enveloped in a simple undivided tegumentary sheath, forming in both the fore and hind extremities a fin resembling in external appearance the paddles of the *Cetacea*. Although other genera of fossil saurians were aquatic and marine, and consequently possessed extremities modified for swimming, as are those of the marine *Chelonians* of the present day, and, in a less striking degree, the feet of the *Crocodiles* among existing saurians, those reptiles only ought, in the opinion of Professor Owen, to be regarded as true Enaliosaurs, which combine limbs fitted for swimming with the cranial and vertebral characters above defined.

The characters of the genera *Plesiosaurus* and *Ichthyosaurus*, the types of the two principal modifications of anatomical structure offered by the Enaliosaurians, are mainly derived from modifications of the vertebral column, as well with regard to the form and configuration of the individual bones, as to the relative groups of the cervical, dorsal, and caudal vertebræ. Professor Owen has also found that the vertebræ afford the best characters for the distinction of species as well as of genera.

The most conspicuous and remarkable character of the vertebræ in *Plesiosaurus* is the extraordinary length of the cervical portion, including from twenty to forty vertebræ. The articular surfaces of their bodies are either flat or slightly convex in the centre, and most frequently concave at the periphery. Two pits are generally presented at the under part of the bodies, but this character is not constant. The cervical vertebræ of the *Plesiosauri* generally present the centrum, the neurapophyses, and the ribs in a separate or unanchylosed state, and although in general no transverse processes are developed in this region, an analogy with the structure characteristic of this part of the spine in the Crocodile is maintained in the division of the articular surface for the cervical rib into an upper and lower portion by a horizontal fissure—a structure which, Mr. Owen observes, is well described and figured by Conybeare in the

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[*] *Geol. Trans.*, vol. v., p. 556, 1st series.

[†] Vol. i., pl. xlix., 2nd series.

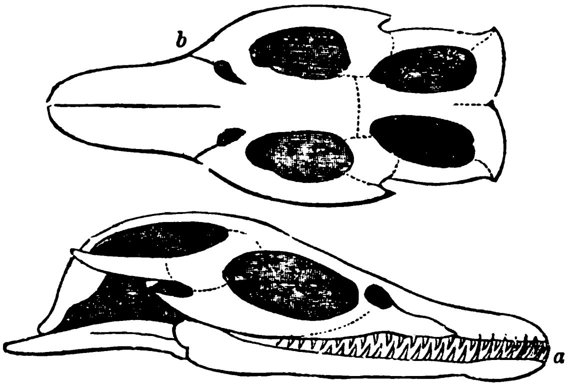
[*] Professor Owen divides the parts or processes of a vertebra into *autogenous* or those parts which are independently developed in separate cartilages, and *exogenous*, or those which shoot out as continuations from these independent constituents.

Autogenous, or true Elements. 1, The *centrum* or body of the vertebra, which, in *Mammalia*, is complicated by two epiphyses. 2, Two superior laminæ developed to protect the great nervous cord, which rests on the upper surface of the *centrum*, and which he has therefore proposed to call *neurapophyses* (*periaux* or *perivertebral* elements of Geoffroy St Hilaire). 3, Two inferior laminæ developed generally to protect the great blood-vessels on the under surface of the centrum, and which he has proposed to call *hæmapophyses* (Chevron bones of Conybeare, *paraaux* or *paravertebral* elements of Geoffroy St. Hilaire—the reasons for not adopting which terms are given by the Professor). 4. The superior process (*epiaux* or *epivertebral* elements of Geoffroy), which is connected and generally anchylosed with the distal extremities of the *neurapophyses*, and forms, in conjunction with those processes, the superior arch of the vertebra. 5, An inferior spinous process, which is connected and commonly anchylosed with the distal extremities of the *hæmapophyses*, forming, in conjunction with these, a chevron or V-shaped bone. To the category of *autogenous* vertebral pieces, he holds that the *ribs*, which generally are anchylosed to the other vertebral elements in the cervical, sacral, and caudal vertebræ of the warm-blooded vertebrate classes, belong.

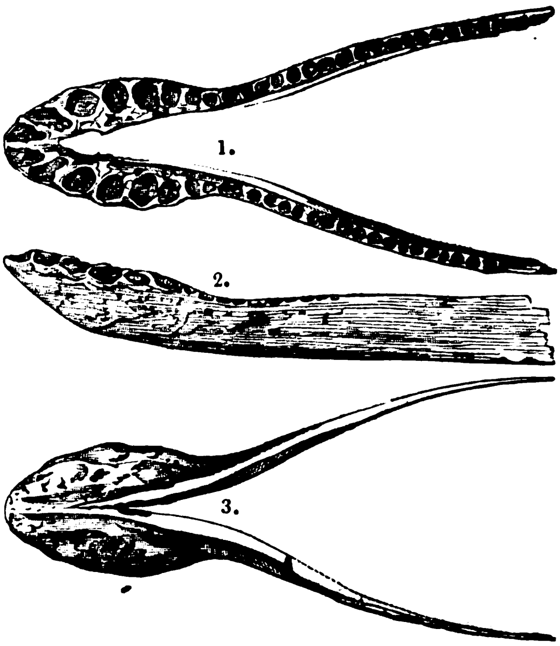
Plesiosaurus dolichodeirus: as these vertebræ of the neck approach the dorsal, the inferior part of the costal articulation becomes smaller, and a corresponding increase of surface is afforded by the superior facet, which also gradually rises from the centrum to the neurapophyses, and in the dorsal vertebræ stands boldly out as a true transverse process from the upper side of the base of each neurapophysis. The transverse processes of the sacral vertebræ subside to the level of the neurapophyses; and as the caudal vertebræ recede from the trunk, the articular surface, which, as in the neck, represents or takes the place of the transverse process, gradually descends, and passes from the neurapophyses to the side of the centrum, but is not divided by the longitudinal groove which characterises the costal surface in the neck: but it must be borne in mind that this groove is more marked in some species of *Plesiosaurus* than others; and indeed Professor Owen has seen Plesiosaurian cervical vertebræ in which no trace of it was visible. 'The neurapophyses,' continues our author, 'are commonly unanchylosed with the vertebral centres in any part of the spine, and in some instances throughout the cervical, and at the anterior part of the dorsal region, the neurapophyses have appeared to be joined each by an articular surface to the spine above, as they are to the centrum below,—the spines here remaining apparently throughout life unanchylosed to the neurapophyses. This condition of the upper vertebral elements is rarely seen in any cold-blooded vertebrate animals, and never in the warm-blooded classes. In those parts of the spine where the vertebræ enjoyed less mobility upon each other than in the neck, the spines become anchylosed to the neurapophyses at an earlier period. The hæmapophyses co-exist with the ribs or paravertebral elements in the caudal region of the spine, but they continue throughout life to be unattached by bone either to the centrum above or to each other below; and here also their spine is not developed, and consequently no true chevron bone is formed in the *Plesiosauri*. The hæmapophyses are also continued along the inferior surface of a great part of the abdomen, forming there the sternal or abdominal ribs; and just as the neurapophyses are developed in the transverse direction to protect the expanded cerebral masses in the cranial region, so here the hæmapophyses are in like manner elongated transversely, and their spine is introduced and modified to form a third mesial rib-like bar, connecting however, as usual, the lower or distal extremities of the hæmapophyses, and completing the osseous cincture of the abdominal viscera. The tail in the *Plesiosauri* is relatively much shorter than in the *Ichthyosauri*, and there is an obvious reason for the curtailment of this part of the animal; for, in the *Plesiosauri*, the length and mobility of the neck renders a special development of the tail for producing the lateral movements of the head unnecessary. The bodies of the vertebræ, in most species of *Plesiosaurus*, are traversed vertically by two vascular canals, which lead from the medullary or spinal canal to the inferior surface of the centrum, where they terminate each by an orifice, and sometimes by two orifices on each side of the middle line. These orifices are not however a constant character of the genus *Plesiosaurus*, neither are they peculiar to this genus, being present in the vertebræ of the *Cetacea*, as well as in those of other *Sauria*. In a section of the vertebral centrum of a *Plesiosaurus*, the osseous texture for some lines near the anterior and posterior articular surfaces is denser than in the rest of the vertebræ, and the direction of the laminæ and fibres is vertical; in the intermediate portion the laminæ are horizontal.'

Cranium.—Though the head of the *Plesiosauri* resembles that of the crocodiles in its general form, it is, as Professor Owen observes, relatively much smaller in proportion to the body. The elongated form of the strong and prominent cranial bones, most of which extend from point to point, with wide interspaces like the timbers of a scaffolding, forms, he remarks, one of the first indications of a deviation from the crocodilian type, and of the affinity of the Plesiosaurus to the *Lacertian Sauria;* and this affinity, he adds, is further exemplified in the condition of many of the individual bones. He proceeds to state that the occipital bone includes the basilar, lateral, or ex-occipital pieces in a permanently separated condition, as in other reptiles; the basi-occipital forms a larger proportion of the articular tubercle for the atlas, and the ex-occipitals a less proportion than in the crocodiles; and the circumference of the *foramen magnum* is completed by the supra-occipital element, in both which respects the Plesiosaurus manifests its affinity with the *Lacertian Sauria.* The mastoid elements extend from the occipital to the tympanic bones; but above these, and between the occiput and the strong arched pedicle supporting the lower jaw, a vacuity leads from the occipital region to the temporal fossæ. The corresponding openings in the skull of the *crocodiles* are, he remarks, reduced to very small size in consequence of the expanded form and oblique position of the tympanic bone, but in the *Lacertian Sauria* they are as wide as they are in the *Plesiosaurus,* if not wider.

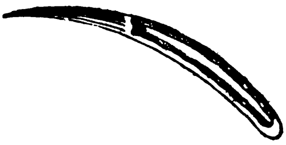
Professor Owen describes the *parietal* bone as strong and triradiate, consisting of a median piece corresponding with the normal parietal in the crocodiles, and of two transverse elongated processes, formed, as it were, by a bifurcation of the posterior part of the median piece; and in a young specimen of *Plesiosaurus Macrocephalus,* in the museum of the earl of Enniskillen, he found the median or sagittal suture dividing the two parietals still distinct; in older specimens of *Pl. Hawkinsii* he always found it obliterated; affording evidence to justify the description of the parietal bone as single and triradiate. The Professor proceeds to notice the median portion of the parietal bone as offering two modifications of structure which point out in a striking manner the deviation of the Plesiosaurus from the Crocodilian type and its approximation to the Lacertian type of the Saurian structure. The first of these is the median crest or ridge, from which the surface slopes away on each side; proving that the temporal muscles were relatively as strongly developed as in the *Iguanæ* for instance, and were only separated from each other at the top of the head by the intermuscular ridge. The ponderous jaws of the crocodiles, on the contrary, are worked principally by the masseter and pterygoid muscles, and in those Saurians the temporal muscles are small and separated by a flattened space occupying nearly the whole of the simple parietal bone. The second modification, which brings the Plesiosaurus near to the lizards, is a moderate-sized elliptical vertical perforation of the median part of the parietal bone, a few lines behind the coronal suture, analogous to the perforation in the *Iguana* described by the Rev. Lansdown Guilding as the *foramen Homianum:* there however it is placed directly upon the coronal suture, in the situation of the *anterior fontanelle;* but the Professor observes that the same foramen exists in many other genera of Lacertian Sauria; and in *Monitor, Lacerta proper,* &c. it is situated entirely in the parietal bone. In the Crocodilians there is no trace of this foramen. The third modification, which approximates the *Plesiosauri* to the Lacertian type and exhibits a difference from the Crocodilian structure, is the posterior bifurcation of the parietal bone, forming processes of considerable length and constituting the most prominent parts of the cranium; these are articulated with the tympanic bone by means of an oblique sigmoid suture. The *frontal* bone consists of a median, two anterior, and two posterior pieces. The median frontals extend as far forwards as the midspace between the small nostrils, and appear to terminate in a point between the commencement of the narrow nasal bones. The interfrontal suture of Lord Enniskillen's young *Pl. macrocephalus* is elevated by a ridge continued forwards from the parietal crest. The outer margin of the median frontal forms the superior boundary of the orbit. The anterior frontal enters into the formation of the anterior and superior angle of the orbit, and is wedged in between the mid-frontal and superior maxillary bones. The posterior frontal bounds the orbit posteriorly, and extends downwards to join the malar bone, like the columnar portion of the post-frontal bone in the crocodiles; but Professor Owen observes that it is broader and more superficially situated in the Plesiosaurus, thus bearing a greater resemblance to the corresponding part of the structure of the skull in the *Lacertian Sauria.* A further and more striking degree of difference from the Crocodilian type is manifested in the posterior frontal, for it is not extended backwards to join the mastoid, so that the skull of the Plesiosaurus does not present an osseous ridge traversing longitudinally the temporal fossa, like a second zygoma, and dividing it into an upper and lower cavity, as in the Crocodiles. The *Zygomatic* element of the *temporal* bone, instead of being extended obliquely parallel with the tympanic bone and joined to it, stretches horizontally from the malar and post-frontal bone backwards to the lower end of the tympanic, and, as in the Lacertian Saurians, becomes at tached by its two extremities only. In its general form, and especially in its length, the tympanic bone is intermediate between the Crocodilian and Lacertian types, exceeding them both however in robustness. In the *facial* bones the resemblance to the Lacertian Saurians begins to diminish, and the approximation to the Crocodiles to increase; and this tendency is further shown in the strength of the whole maxillary apparatus, the great relative size of the intermaxillary bones, the rugged exterior surface of the osseous parts, and particularly in the distinct alveolar cavities of the teeth: but a striking exception to this tendency is manifested in the external nostrils; their size and position, combined with the structure of the paddles, point out the analogy of the extinct Enaliosaurs to the existing Cetaceans, offering, as the Professor observes, a beautiful example of the adaptation of structure to the peculiar exigencies of a species. The respiratory apertures are situated a little before the orbits near the highest part of the head: in the Crocodiles they are placed near the anterior extremity of the snout, blended together into a single aperture, and having nearly the whole of their circumference formed by the intermaxillary bones, which, in *Plesiosaurus*, make an extremely small part of the boundary of the nasal apertures, which last chiefly consist on each side of an interspace at the convergence of the anterior frontal, nasal, and superior maxillary bones, and are separated from each other by the nasal bones, as in the *Lacertian Sauria.* The intermaxillary suture extends from the anterior part of the nostrils forwards to a little more than half way between the orbit and the anterior extremity of the cranium. One of the strongest of the inferior teeth usually rises just in front of this suture, and there a slight notch seems, the Professor observes, to correspond with that tooth, presenting a resemblance to a very characteristic structure in the true Crocodiles. The lachrymal bone forms a great proportion of the anterior part of the orbit, and the superior maxillary enters next into the formation of the circumference of the orbit below the lachrymal bone: the malar bone rests upon its posterior extremity by an oblique suture. The posterior margin of the malar bone is joined to the posterior frontal bone as well as to the zygomatic, thus completing the osseous boundary of the orbit posteriorly. The usual complicated structure observable in the Saurians appears in the *lower jaw* of the *Plesiosaurus.* The dentary piece presents evidence of its soon becoming anchylosed to its fellow at the symphysis: it is chiefly remarkable for the expansion of its anterior extremity. No intervening vacuity separates the angular and surangular pieces as in the Crocodiles, but those pieces are joined together throughout, as in the Lacertian group. The surangular piece rises higher and forms a sharper edge for the insertion of the temporal muscles than in the Crocodiles, a structure which agrees with the greater development of these muscles, as indicated by the size of the temporal fossæ. 'The articular piece presents a regular and deep concavity for the reception of the articular end of the tympanic bone: it is, as Mr. Conybeare has well remarked, more developed than in the Crocodile, and thus approximates more nearly to the corresponding part in the Lacertian type. The angular piece is prolonged backwards beyond the joint, but not quite to the same extent as in the Crocodiles.'



Skull of Plesiosaurus restored. (Conybeare.)
a, profile; *b*, seen from above.

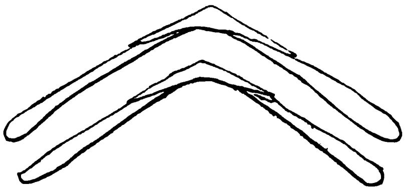


Under jaw of Plesiosaurus (anterior part).
1, seen from above; 2, profile; 3, seen from below. (Conybeare.)



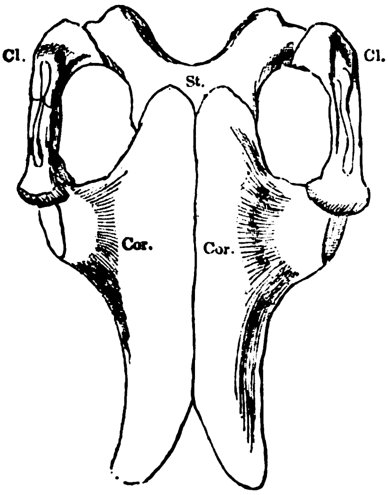
A tooth slightly magnified. (Conybeare.)

Professor Owen next proceeds to describe the *sterno-costal arcs*, observing that the ordinary or vertebral ribs have been already spoken of as essential parts or appendages of a vertebra. The free extremities of the ribs are connected together, in the abdominal region, by the series of intermediate, slender, elongated pieces, to which Conybeare gave the appropriate designation which has just been noticed. Each of these sterno-costal arcs includes, in the Plesiosaurus, seven pieces. The median piece is transversely elongated, slightly bent, and pointed at both extremities; the lateral pieces are similarly formed, except that the extremity of the outermost, which joins the vertebral rib, is obtuse: each piece, continues Professor Owen, as it recedes from the median line, overlaps the anterior part of the rib which it succeeds, where it is adapted to an oblique groove. This kind of joint, observes the Professor, probably admitted of a yielding or sliding motion of the pieces one upon the other, and favoured, as Dr. Buckland has remarked, considerable expansion of the cavity containing the lungs.



Sterno-costal arcs of Plesiosaurus. (Conybeare.)

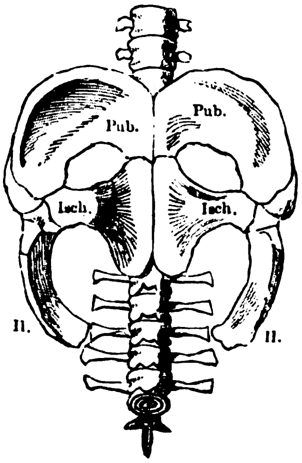
Pectoral arch. The broad coracoid bones, remarkably expanded as they are in the antero-posterior direction, are noticed by Professor Owen as the most conspicuous of those composing the pectoral arch: he describes their internal and anterior margins as gently convex, and meeting at the mesial plane, where they overlap the anterior thoracic ribs. Into their anterior interspace is wedged the ento-sternal piece, consisting of a short mesial process and two broad lateral expansions. A strong triradiate bone, which, in Mr. Owen's opinion, seems to represent, as in the Chelonians, the scapula and clavicle united, is arched from the outer extremity of the coracoid bones, with which it combines to form the shoulder-joint, near which last point it sends upwards and obliquely backwards, a branch or process representing the true scapula



Humero-sternal part of Plesiosaurus. (Conybeare.)
St., sternum; Cl., clavicle; Cor., coracoids.

Pectoral extremity. The *humerus* is described as a stout and moderately long bone, curved slightly backwards, rounded at its proximal extremity, and flattened as it approaches the elbow joint. The *radius* and *ulna* are both short and flat bones, but relatively longer and more distinctly marked than in *Ichthyosaurus*; the *radius* is nearly straight; the *ulna* curved, its concavity being directed towards the radius. The distinctly defined *carpus* consists of a double row of small flat rounded *ossicula*, in number from six to eight. The *metacarpal* bones are elongated, slender, flattened, and slightly bent. The fingers, or 'digits,' as they are termed by Mr. Owen, never exceed the number of the metacarpal bones, but generally consist of more than the usual number of phalanges. The first or radial digit, which corresponds with the thumb, has generally three phalanges, the second six or seven, the third eight or nine, the fourth eight, and the fifth six phalanges. These bones, the Professor observes, are moderately long and slender, but gradually taper towards the distal end of the digits; and they are joined together in each digit by flattened surfaces, indicative of a mere yielding movement on one another; he has little doubt that they were enveloped, like the paddles of the *Cetacea*, in a common sheath of integument.

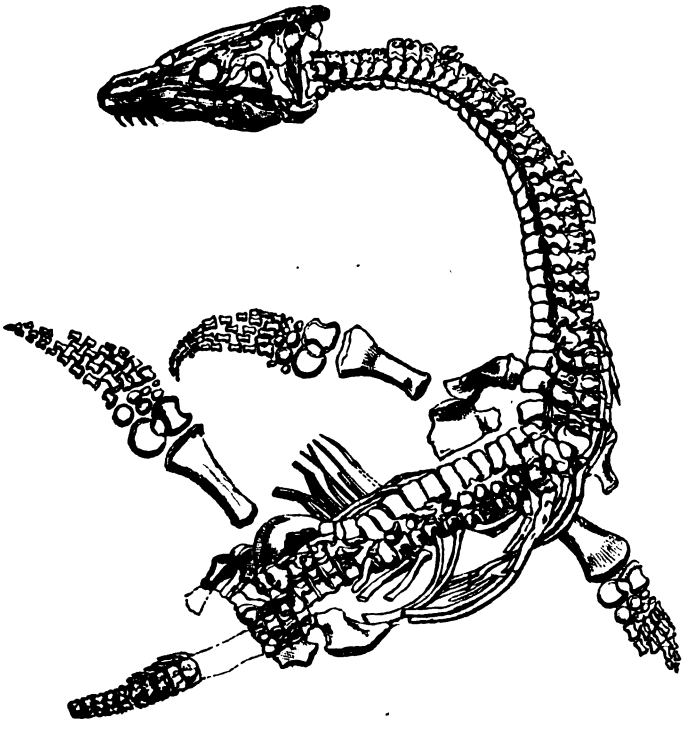
Pelvic arch. The hinder or pelvic extremities are described as almost always equal, sometimes, as in *Pl. macrocephalus*, exceeding the anterior ones in size, and the pelvic arch as consisting of a strong and short *ilium*, and a broad *pubis* and *ischium*, both of which are expanded in the antero-posterior direction analogously to the coracoid bones in the pectoral arch.



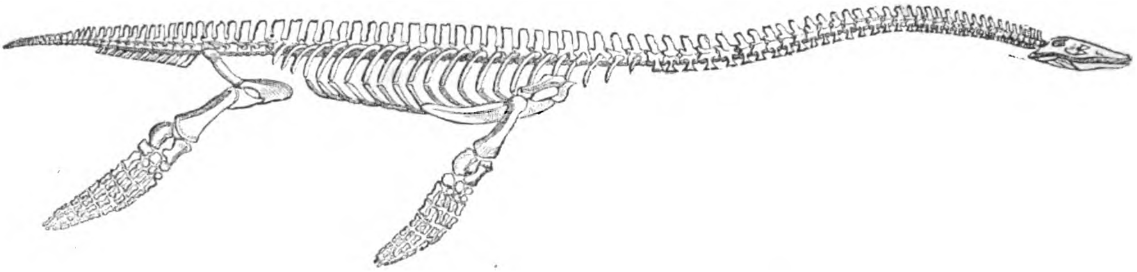
Pelvis of Plesiosaurus. (Conybeare.)
Pub., pubis; Isch., ischium; Il., ilium.

Pelvic extremity. Professor Owen remarks that the radiated appendages of the pelvic arch so closely correspond with those of the pectoral arch, as to require little notice. In the modifications of the two bones of the leg, he found that the posterior bone, or *fibula*, corresponds in its curved form with the *ulna*, illustrating an analogy manifested in other animals. The *tarsal* bones are principally remarkable for their small size on the tibial or anterior side of the series, indicating that the hind paddle had a freer inflection forwards, or upon the *tibia*, than in the opposite direction. This structure, the Professor observes, may have given a compound motion to the propelling stroke of the paddle, similar to that which in skilful rowing is called 'feathering' the oar.

The five *metatarsals* and their digits are found to correspond in structure with those of the fore paddle. The first



Plesiosaurus macrocephalus. (Buckland; Owen.)



Skeleton of Plesiosaurus dolichodeirus restored. (Conybeare principally.)

or tibial metatarsal supports three phalanges, the second five, the third eight or nine, the fourth eight, and the fifth six. The articulating extremities of the phalanges of both the fore and hind paddles are, Mr. Owen observes, subconcave, with an irregular surface, indicating that they were joined by ligaments or fibro-cartilage, and not by synovial membrane.

For the particular variations in the skeletons of the different species we must refer to the able memoir from which the above general description of the osseous parts is taken.

The following species, sixteen in number, are recorded by Professor Owen :—*Plesiosauri Hawkinsii*, Owen ; *dolichodeirus*, Conybeare ; *macrocephalus*, Conybeare ; *brachycephalus*, Owen ; *macromus*, Owen ; *pachyomus*, Owen ; *arcuatus*, Owen ; *subtrigonus*, Owen ; *trigonus*, Cuv. ; *brachyspondylus*, Owen ; *costatus*, Owen ; *dœdicomus*, Owen ; *rugosus*, Owen ; *grandis*, Owen ; *trochanterius*, Owen ; and *affinis*, Owen.

Habits of Plesiosaurus.—We now proceed to examine the structure of this extraordinary animal. Dr. Buckland truly observes that the discovery of this genus forms one of the most important additions that geology has made to comparative anatomy. 'It is of the Plesiosaurus,' says that graphic author, in his 'Bridgewater Treatise,' 'that Cuvier asserts the structure to have been the most heteroclite, and its characters altogether the most monstrous that have been yet found amid the ruins of a former world. To the head of a lizard it united the teeth of a crocodile ; a neck of enormous length, resembling the body of a serpent ; a trunk and tail having the proportions of an ordinary quadruped, the ribs of a cameleon, and the paddles of a whale. Such are the strange combinations of form and structure in the *Plesiosaurus*,—a genus, the remains of which, after interment for thousands of years amidst the wreck of millions of extinct inhabitants of the antient earth, are at length recalled to light by the researches of the geologist, and submitted to our examination in nearly as perfect a state as the bones of species that are now existing upon the earth.' Conybeare thus speaks of the supposed habits of this extinct form, which he had in a manner built up before our eyes, when materials were very scanty compared to those which have since been discovered:—'That it was aquatic is evident from the form of its paddles ; that it was marine is almost equally so, from the remains with which it is universally associated ; that it may have occasionally visited the shore, the resemblance of its extremities to those of the turtle may lead us to conjecture ; its motion however must have been very awkward on land ; its long neck must have impeded its progress through the water, presenting a striking contrast to the organization which so admirably fits the Ichthyosaurus to cut through the waves. May it not therefore be concluded (since, in addition to these circumstances, its respiration must have required frequent access of air) that it swam upon or near the surface, arching back its long neck like the swan, and occasionally darting it down at the fish which happened to float within its reach? It may perhaps have lurked in shoal water along the coast, concealed among the sea-weed, and, raising its nostrils to the surface from a considerable depth, may have found a secure retreat from the assaults of dangerous enemies ; while the length and flexibility of its neck may have compensated for the want of strength in its jaws, and its incapacity for swift motion through the water, by the suddenness and agility of the attack which they enabled it to make on every animal fitted for its prey which came within its reach.' (*Geol. Trans.*, vol. i., part 2, p. 388, N. S.)

Of the general characters of the *Ichthyosauri* Professor Owen treats as follows :—

'The Enaliosaurians of the present family differ from those of the preceding most remarkably in the shortness of the neck and the equality of the width of the occiput with that of the thorax, which almost immediately succeeds it, impressing the observer with the conviction that the recent animal must have resembled a cetacean or a fish in the total absence of any cervical constriction.

'This close approximation in the *Ichthyosauri* to the form of the most strictly aquatic animals of the existing creation is accompanied by an important modification of the articular surfaces of the vertebral centres, each of which surfaces presents a well marked concavity, leading to the inference that they were originally connected together by an elastic capsule, filled with a fluid, as in the vertebral joints of the back-bone of fishes, and the Perennibranchiate or most fish-like of the *Reptilia*.

'The structure of the fins of many species of *Ichthyosaurus* deviates from that of the cetacean paddles, and approaches in certain peculiarities more closely to that of the fins of fishes than has yet been found in any other reptile. First, the digits exceed the typical number *five*, and resemble in their numerous and small constituent phalanges the jointed rays which support the natatory membrane of the pectoral and ventral fins of true fishes ; and, secondly, numerous cartilaginous bifurcate rays were added to the bony apparatus which supports the tegumentary expansion.

'With these important modifications of the head, trunk, and extremities in immediate relation to aquatic progression, the law of the correlations of organic structure would lead us to anticipate some corresponding modification of the tail. Accordingly we find the vertebræ of this part to be much more numerous than in the previously-described Enaliosaurian group. There is no trace however of any confluence of the terminal caudal vertebræ, or of any modification of their elongated neur-apophysial and hæm-apophysial spines, such as form the characteristic structure supporting the tail of the osseous fishes. The numerous caudal vertebræ gradually decrease in size to the end of the tail, where they assume a compressed form ; and thus the tail, instead of being short and broad, as in fishes, is lengthened out, as in the crocodiles.

'The very frequent occurrence of a fracture of the tail about one-fourth of the way from its distal extremity, had led me to suspect it to be in some way connected with the presence of a tegumentary caudal fin ; and the laterally compressed form of the terminal vertebræ, since ascertained by Sir Philip Grey Egerton, has almost demonstrated the existence of such a fin.[*] The only evidence in fact which the skeleton of the cetaceous mammal affords of the powerful horizontal caudal fin which characterises the recent animal is the depressed or horizontally flattened form of the terminal vertebræ. We may infer therefore, from the corresponding vertebræ of the *Ichthyosaurus* being flattened in the vertical direction, or from side to side, that it possessed a caudal tegumentary fin expanded in the vertical direction ; and it would be highly advisable to examine narrowly the lias matrix in which the tail of the Ichthyosaur may have been imbedded for traces of carbonaceous discoloration, or of an impression of this fin, from which some idea might be formed of its shape and size.[†]

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[*] See Professor Owen's paper 'On the Dislocation of the Tail at a certain point observable in the Skeleton of many Ichthyosauri,' *Geol. Trans.*, vol. v., p. 511, second series, just published (July, 1940); and see the article ICHTHYOSAURUS, vol. xii., p. 432.

[†] 'I would more particularly recommend this observation to be made on specimens of *Ichthyosaurus* from the lias of Barrow-on-Soar, which appears to have been more favourable for the preservation of the soft integument than in other localities. The specimen from which Dr. Buckland described the tegument of the abdomen, and that in which the tegument of the fin and the soft rays were described by me, were both from Barrow-on-Soar.' (Owen.)

'Thus, in the construction of the principal natatory organ of the *Ichthyosaurus* we may trace, as in other parts of its structure, a combination of Mammalian, Saurian, and Ichthyic peculiarities. In its great length and its gradual diminution we perceive the Saurian character; its tegumentary nature, unsupported by osseous rays, bespeaks its affinity to the Cetaceans; while its vertical position brings it close to the peculiar condition of the natatory organ in the fish.

'But it may be argued, the horizontality of the caudal fin of the *Cetacea* is essentially connected with their exigencies as breathers of the atmospheric air: without this means of displacing a mass of water in the vertical direction, the head of the whale could not have been brought with the required rapidity and facility to the surface to inspire; and as the *Ichthyosaurus* was also an air-breather, a like position of the caudal fin might be considered to be equally essential to its existence in the water.

'To this objection it may be replied that the *Ichthyosaurus*, not being warm-blooded, would not require to bring its head to the surface so frequently, or perhaps so rapidly, as the Cetacean; and moreover a compensation for the absence of a horizontal terminal fin is provided in the presence of the two posterior extremities, which are modified as paddles, and which are wholly deficient in the *Cetacea*.

'Thus I conceive that the living Ichthyosaurus must have presented the general external figure of a huge predatory abdominal fish, with a longer tail and smaller caudal fin than usual; scaleless moreover, and covered, according to the minute and careful observations of Dr. Buckland, with a smooth or finely-wrinkled skin analogous to that of the *Cetacea*.

'A closer inspection of the enduring parts of these singular inhabitants of the antient deep shows that under their fish-like exterior was concealed an organization which, in the main, is a modification of the Saurian type.'

Professor Owen, after observing that the general form of the cranium resembles that of the dolphin, but differs from it in the comparatively feeble development of the cerebral cavity, and still more essentially in the unanchylosed state of the composite cranial bones, enters into a most careful and detailed description of the skeleton, which our limits will not permit us to follow throughout, but every word of which should be attentively perused by the physiologist. We cannot however refrain from laying before the reader his description of the *pectoral arch* and the adaptation of this part of the organization, in particular, to the wants of the animal.

'We have already remarked,' says the Professor, 'that the extremities bear a resemblance, in their bony structure, to the paddles of the *Cetacea*. But this resemblance is limited to the radiated system of bones, i.e. to the *brachium, antibrachium,* and *manus*. The mode in which the locomotive member is connected with the trunk is entirely different in the two aquatic tribes. In the *Cetacea* the pectoral fin is attached to a simple scapula with a rudimental acromial and coracoid process, and is merely suspended in the flesh. In the *Ichthyosaurus*, as in the *Plesiosaurus*, the pectoral fin is connected with, and must have acted upon, a powerful and resisting osseous arch, having the sternum for its keystone. The sternum in fact here exists solely for the function of the anterior members, and does not enter at all into the formation of the costal arches or the respiratory cavity. In the *Cetacea*, on the contrary, the sternum is limited to its connection with the ribs, and to the completion of the thoracic cavity.

'In the *Ichthyosaurus* the representative of the sternum is analogous to the episternal element as it exists in the *Ornithorhynchus* and Lacertian *Sauria*, and, as in many of the latter tribe, it presents a triradiate form. One branch occupies the median line of the pectoral arch, is broad and flat, and rounded posteriorly; the other two rays branch off from each of the anterior angles of the median piece, and, diverging laterally, follow the curvature of the superimposed clavicles, to the posterior and middle part of which they are closely attached: as they proceed outwards these lateral rays of the *episternal* bone gradually diminish to a point.

'The scapula is a short but stout and broad bone, presenting the simple parallelogramical form which characterises it in the *Oviparous Vertebrata*. The anterior margin is fixed to the clavicle and to the extremity of the lateral process of the episternum· the inferior extremity presents two facets, one of which is attached to the coracoid bone, the other forms part of the articular surface for the humerus.

'The coracoid bones, which constitute, at their contracted and thickened outer extremities, the remainder of the glenoid cavity, become suddenly and remarkably thinner and expanded as they pass inwards to articulate with the episternal bone. They are also complicated each in the young *Ichthyosauri* with an epiphysial piece wedged into the angle between their anterior margins and the episternum, which pieces correspond with the epicoracoids of the Lacertian *Sauria* and *Ornithorhynchus*. The existence of these bones I have determined in some of the beautifully worked-out skeletons in the collection of Mr Hawkins.

'The clavicles are strong, elongated, slightly curved bones, thicker in the middle than at their extremities, articulated by an oblique suture to the transverse processes of the episternum, with their median extremities in contact, but not anchylosed together as in the furculum of the bird: in this respect, as in their connection with the episternal bone, they correspond with the clavicles of the *Ornithorynchus*. In the entire mechanism of the complex pectoral arch indeed the resemblance between these very different animals is remarkably close, as Mr. Clift first pointed out, while the difference which both these air-breathing aquatic animals present in this part of their osseous structure from the *Cetacea* is very striking. In the *Cetacea*, for example, there is not any osseous bar interposed between the two shoulder-joints, or the centres on which the fore-paddle worked, while similar movements of the fore-paddles of the *Ichthyosaurus* and *Ornithorhynchus* had and have their momentum transferred to and resisted by not less than three transverse bones, viz. first, by the clavicles, secondly, by the episternal forks and the scapulæ, and thirdly, by the coracoids and scapulæ. To what difference in the habits of these species had these differences of structure reference? Most assuredly it could not relate exclusively to the necessity of rising to the surface to respire air, as conjectured by Sir Everard Home;* for this necessity existed in all the three types of aquatic animals, and much more imperatively in the *Cetacea* than in the *Enaliosauria*. In the *Ornithorhynchus* the anterior extremities are directed outwards, as in the marine *Cetacea* and *Enaliosauria*; but they are destined in that quadruped to be applied not only to displace water, but to be occasionally pushed against a more resisting surface, as the dry land: in order therefore to enable the fore limbs to react with due force upon the body, a strong apparatus of bone is introduced between the two shoulder-joints, whereby these parts are prevented from yielding inwards upon the soft muscular mass. But in the *Cetacea*, which were never intended to quit the deep, such an apparatus of bone, as it would have added unnecessarily to their weight, has been excluded from the mechanism of their anterior extremities: and hence it is that, when they have the misfortune to be stranded, they are unable to regain their native element. The instrument for bringing the head to the surface of the water for the purpose of breathing is the same in both the Monotreme and the Cetacean, viz. a strong muscular horizontally flattened tail. In the *Ichthyosaurus* a pair of hinder paddles (which in the large-headed species, as the *Ich. platyodon*, are equal in size with the fore-paddles) must have fully compensated for that different construction of the tail, which, while it rendered it less efficient as a means of raising the head to the surface, made it a more perfect instrument in ordinary natation; and the sufficiency of this compensation will be better appreciated when it is remembered that the reptilian structure of the lungs and heart of the *Ichthyosaurus* would allow it to dispense with so perfect a machinery for rising to the surface as was essential to the warm-blooded aquatic species above cited.

'For what purpose then were sterno-clavicular and coracoid arches assigned to the *Ichthyosaurus*? Doubtless that the anterior paddles might be subservient to locomotion not only in the water but on land; that when applied to the resisting soil, they might react with due force upon the trunk. It is very conceivable that the *Ichthyosaurus*, like the crocodile, may have come ashore to sleep: it is most probable that they resorted to the shore to deposit their eggs, supposing them to have been oviparous, as the sum of the analogies deducible from their osseous texture would indicate. The hind paddles would also be serviceable in terrestrial progression, as in the *Ornithorhynchus*, while in the strictly marine *Cetacea* they could readily be dispensed with.'

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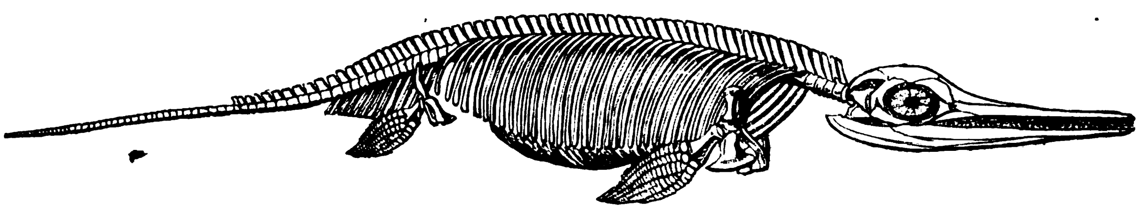
* 'Phil. Trans.,' 1818.

The number of species of *Ichthyosaurus* recorded by Professor Owen, amounts to ten, viz. *Ichthyosauri communis*, Con.; *intermedius*, Con.; *platyodon*, Con.; *lonchiodon*, Owen; *tenuirostris*, Con.; *acutirostris*, Owen; *latifrons*, Kœnig; *latimanus*, Owen; *thyreospondylus*, Owen; and *trigonus*, Owen



Skeleton of Ichthyosaurus—restored. (Conybeare, principally.)

Geographical Distribution, &c.—Professor Owen concludes a Report, which leaves nothing to be wished, by remarking that with respect to the geological relations of the *Enaliosauria*, or the extent of strata through which their relics have been traced, his researches are merely confirmatory of the generalisation already enunciated by Mr. Conybeare and Dr. Buckland. 'The British Enaliosaurs,' says Professor Owen, 'extend through the whole of the oolitic period, including the lias and oolite proper, to the wealden and chalk formations, the most recent depositary being the chalk marl, in which Ichthyosaurian remains have been discovered by Dr. Mantell, at Dover. Dr. Buckland has found similar remains in the gault near Benson, Oxon; and I have seen the humerus of a *Plesiosaurus* from the gault near Maidstone.' (*Report.*)

External Integument.—The tegumentary covering of the Plesiosaurus was in all probability similar to that of the *Ichthyosaurus*. (See ante, pp. 256, *n.*, 257, and ICHTHYOSAURUS, vol. xii., p. 433.) Mr. Swainson, in his 'Natural History and Classification of Monocardian Animals' (vol. ii., 1839), speaking of the *Ichthyosaurus*, says, 'We have no means of ascertaining the nature of its external skin, whether it was naked as in frogs, or hard as in crocodiles. The first conjecture however seems most probable.' In 1836, Dr. Buckland had published figures of portions of the integument of Ichthyosaurus, in his 'Bridgewater Treatise' (vol. ii., pl. 10, ff. 1, 2, 3, 4); and Sir Philip Grey Egerton is in possession of a hind-paddle of Ichthyosaurus, with its under side exposed, and showing the member covered with a skin, which reminds the observer of somewhat between the integument of a shark and that of a turtle on a similar part.

Place in the System.—MM. Duméril and Bibron arrange Plesiosaurus and Ichthyosaurus under their *Sauriens Aspidiotes fossiles*, an arrangement to which we cannot subscribe on account of their tegumentary covering, and for the reasons given in the article CROCODILE. [Vol. viii., p. 169.]

Hermann von Meyer places the genera between *Iguanodon* and *Mosasaurus*

Mr. Swainson makes the *Elanosaures* (*Enaliosauri*, or *Enaliosauria*, we suppose, is meant) the third order, arranging it between the order *Chelonides* (Tortoises) and *Ophides* (Serpents). In that part of the work headed 'Synopsis and Natural Arrangement of the Class of Reptilia,' Mr. Swainson's definition of the *Elanosaures, Fish Lizards*, is: 'Body lacertiform, feet fin-shaped, jaws exceedingly long;' and he arranges under it 'Plesiosaures' (*Plesiosaurus*), 'Ichthyosaures' (*Ichthyosaurus*), *Saurocephalus*, and *Pterodactylus*. In a subsequent part of the work, headed *A Natural Arrangement of the Class Reptilia*, the 'Elanosaures, Fish Lizards,' are thus defined:—'Lacertiform; feet in the form of fins, as in the aquatic turtles; tail short, compressed; the articulating surfaces of the vertebræ concave; eyes very large, nocturnal.' The genera comprising the order *here*, are *Ichthyosaurus, Plesiosaurus*, and *Saurocephalus*, Harlan; *Pterodactylus* being omitted.

By microscopical examination of a tooth of the fossil presented to him by Dr. Harlan, Professor Owen has proved the *Saurocephalus* to be a true osseous fish, nearly allied to, if not actually a Sauroid fish, as M. Agassiz had previously conjectured.

Professor Owen's opinion of the zoological situation of the Enaliosaurians, will be seen in the excellent Report from which we have drawn so largely.

PLESKOW. [PSKOW.]

PLE'STIODON, a name given by MM. Duméril and Bibron to a genus of their Scincoidian Lizards, or Lepidosauri (Saurophthalmes)—*Euprepis* of Cocteau, Euprepis, part, of Wagler—which they thus characterise:—

Nostrils opening in the middle or nearly in the middle of the nasal plate; two supero-nasal plates. Palate with a wide median groove, opened out at its anterior extremity; pterygoidian teeth; scales smooth.

PLETHO'RA (a Greek word, πληθώρη, *plethóre*, fulness, in which sense it is used by the Greek medical writers) signifies a redundancy of blood. By the older writers the term was used to express an imagined superabundance of any of the fluids of the body; and the terms bilious, lymphatic, and milky plethora, &c., implied the existence of an excess of one or other of those fluids in the blood. Distinctions were also made, and by a few are still retained, between plethora from excess of blood, from insufficient capacity of the vessels, from deficient strength, and so on. By the majority of the physicians of the present day however, the term plethora is used only to express that condition in which the quantity of blood and its nutritive qualities exceed that standard which is compatible with present or the prospect of continued health.

Plethoric persons are marked by a florid ruddy complexion, a full hard pulse, a tendency to hemorrhage from the nose or other parts, a frequent sensation of fatigue and weight in the limbs, a disposition to sleepiness, and by being in what is commonly termed good condition. In this degree plethora cannot be regarded as more than giving a tendency to disease whenever any slight occasional cause is applied. In a greater degree however, it produces effects which are in themselves important: the complexion is yet fuller and more florid, the face seems swollen, and the eyes blood-shot, there is pain in the head, with giddiness, ringing in the ears, dullness, heavy sleep, and a sensation as of flashes before the eyes, inability of exertion, constant feeling of fatigue, and frequent palpitation of the heart.

Such a condition, to which some persons seem from birth peculiarly predisposed, may be produced in nearly all by the constant use of very nutritious food, by gluttony or excess in beer, by indolence, or by the insufficiency or suppression of some habitual discharge. Its principal evil is that it renders the person who is affected by it peculiarly liable to acute inflammations and to hemorrhages in important organs, as the brain, in which the latter produce apoplexy. To avoid such consequences, a less nutritious diet, abstinence from exciting drinks, and the regular employment of active exercise are commonly sufficient; but in more advanced and in extreme cases of plethora, blood must be drawn freely both from the arm and from the neighbourhood of any organ in which there seems a peculiar disposition to its accumulation, or from which it was once habitually discharged; active aperients should also be administered, and the diet should be reduced to a much lower scale than that which had the chief share in engendering the disorder.

PLEURA is the membrane which envelopes the lungs and lines the cavities of the chest. On the walls of each cavity of the chest the pleura costalis (as it is here called) is formed by a sheet of fine and elastic cellular tissue, loosely attached to the ribs, intercostal muscles, and other subjacent parts. On the exterior of the lung the pleura pulmonalis is composed of a thin superficial layer of fine cellular tissue, and a deeper layer of coarser fibrous tissue, which in most of the large quadrupeds, and in the seal and some other animals, is very elastic, and affords an important assistance in the act of expiration. The surfaces of the two portions of pleura are continuous with each other at the root of the lung; each is covered with a delicate layer of epithelium; and they enclose within them a space called the sac of the pleura, into which a small quantity of serous fluid is constantly secreted, which moistens the opposite surfaces of the lung and of the wall of the chest, and permits their free motion upon each other. [MEMBRANE.]

PLEURISY, a word derived immediately from the French *Pleurésie*, which comes from the Greek πλευρῖτις, and this again from πλευρὸν, *the side*, which is defined by Rufus Ephesius (*De Corp. Hum. Part. Appell.*, pp. 30, 51, ed. Clinch) to mean πᾶν τὸ ὑπὸ τῇ μασχάλῃ, 'all that part which is under the arm-pit.'[*] As this is one of the diseases of which both the nature and the treatment were understood by the antients almost as perfectly as by ourselves (except of course that they had not the assistance of auscultation and percussion to help them in forming their diagnosis), it may be as well to give in their own words those passages which have been repeated with more or less alteration by every succeeding writer on the subject, omitting those which are either erroneous from their less accurate knowledge of anatomy, or which rest only upon some fanciful theoretical speculation, and adding whatever may be necessary to bring the article as far as possible up to the level of the present state of medical science.

'Pleurisy, properly so called,' says Paulus Ægineta (*loco cit.*, in Mr. Adams's translation, 8vo., London, 1834), 'is an inflammation of the membrane which lines the ribs, and is attended with difficulty of breathing, cough, continual fever, and pain shooting to the clavicle and hypochondrium,' which definition agrees with that given by Galen (*De Loc. Affec.*, lib. v., cap. 3, p. 326, ed. Kühn; *Ad Glauc. de Med. Meth.*, lib. ii., cap. 1, p. 77; *Introd.*, cap. 13, p. 734; *Definit. Med.*, § 264), Aretæus, Aëtius, and Alexander Trallianus (*locis cit.*). The disease has been variously divided by different writers; Dr. Good (*Study of Med.*) mentions the three following varieties:—1, Pleuritis Vera, True Pleurisy. Fever, a cauma; pain felt chiefly on one side, the inflammation commencing in that part of the pleura which lines the ribs. 2, Pleuritis Mediastina, Pleurisy of the Mediastinum. Heavy pain in the middle of the sternum, descending towards its ensiform cartilage; with great anxiety; the inflammation, from its symptoms, being obviously seated in the mediastinum. 3, Pleuritis Diaphragmatica, Pleurisy of the Diaphragm. Painful constriction around the præcordia; small, quick, laborious breathing; manifesting that the inflammation is seated chiefly in the diaphragm. He adds however, that the subdivisions lead to nothing of practical importance, as the causes are nearly alike, and the same mode of treatment is applicable to the whole. A more essential distinction is that adopted by Dr. Law (*Cyclop. of Pract. Med.*), viz. acute and chronic, and this will be followed here, because it seems almost impossible to treat either of the nature or the treatment of these two forms of pleurisy under one and the same head.

In acute pleurisy, says Aretæus (*loco cit.*, in Dr. Reynolds's translation, 8vo., London, 1837), 'we have acute pain in the clavicular region, together with a sharp burning heat; the recumbent posture is easy on the inflamed side, because there the membrane remains in its place, but to lie on the opposite one is exceedingly painful, and from the weight, inflammation, and dragging, the pain extends through the whole continuity of membrane to the shoulders and clavicles, in some even to the back and shoulder-blades. To this succeed dyspnœa, watchfulness, loathing of food, bright redness of the cheeks, a dry cough, difficult expectoration. To this description it may be added, from Paulus Ægineta, that 'the pulse is hard and serrated;' and it should be noticed that the *decubitus*, or position of the patient, mentioned by Aretæus and repeated by numerous modern writers, is not constant, and therefore cannot bo exclusively relied upon as a diagnostic sign, for it is sometimes observed that the aggravation of the acute lancinating pain caused by the pressure when lying upon this side, makes the patient seek a more easy position either upon the opposite one or upon the back.

With respect to the diagnosis of pleurisy, it may be distinguished from hepatitis, says Paulus Ægineta, by the pain in pleurisy being pungent, and the cough being sometimes without expectoration and sometimes with it, and by the pulse being hard and serrated; while in inflammation of the liver the pain is not pungent, nor is the pulse so hard, and the cough throughout is dry and without expectoration, and the face appears pale. (Compare Alex. Trall., *loco cit.*) It may be distinguished from inflammation of the external muscles, or pleurodynia [PLEURODYNIA], by the latter affection being (according to the same author) unaccompanied with cough and expectoration, nor is the pulse hard. From pneumonia it is hard to distinguish it without calling in the aid of auscultation and percussion, and indeed Dr. Cullen, in his 'Practice of Physic,' has treated of both these affections under one common definition. It may however be observed (with Dr. Good) that in pleurisy the face is comparatively but little flushed, and far less tumid than in pneumonia; that the pulse is harder, and that the seat of the pain is fixed, while in pneumonia it shifts not only to different parts of the same side, but often from the one side to the other. The characteristic cough of pleurisy (as distinguished from that which follows pneumonia) is a short cough, either dry from the beginning to the end, or accompanied with a thin mucous expectoration; should the sputa be more abundant, or deviate from this character, we may suspect a complication either of pneumonia or bronchitis. The cough however (adds Dr. Law) is often wanting altogether, or is so slight as to attract the attention of neither the patient nor physician. For the characteristic signs of pneumonia derived from auscultation and percussion the reader must see the article LUNGS, DISEASE OF THE, while only those relating to pleurisy will be given here. Upon auscultation the inspiration will appear feeble, distant, or inaudible, but will be restored by change of posture. *Ægophony* will exist when the quantity of fluid effused is no more than forms a thin layer between the lungs and parietes of the chest. The *bruit de frottement*, or *sound of friction*, will be heard when there is partial albuminous exudation with little or no effusion of serum. Upon percussion there will be more or less loss of sound, with moderate resistance, decreasing from below upwards; and this dulness will be diminished or removed by change of position. It was in cases of pleuritic effusion that Hippocrates proposed the succussion, or shaking of the chest, as a means of assisting the diagnosis (*De Morb.*, lib. i., p. 173, ed. Kühn; *ibid.*, lib. ii., pp. 256, 258; *Coac. Prænot.*, p. 306; *De Loc. in Hom.*, pp. 123, 124); but it is now known that no sound can be heard unless air be present in the chest at the same time,—that is, unless empyema be combined with pneumothorax, which is a rare occurrence.

With respect to the anatomical characters of pleurisy, they agree with what may be observed in inflammation of all serous membranes, and consist partly in morbid alterations of the pleura itself, and partly of the secreted fluid. Inflammation of the pleura, says Laennec, is always accompanied by an extravasation on its internal surface; the matter effused being either coagulating lymph termed a *false membrane*, or else serosity, or a sero-purulent fluid. The false membrane, or exudation of lymph, is gradually changed into cellular substance, or rather into a true serous tissue, like that of the pleura. The serous effusion is absorbed, the compressed lung expands, and the false membrane investing it and the pleura costalis become united into one substance, which afterwards becomes vascular and organised, and constitutes permanent adhesions. A severe pleurisy that has terminated by numerous adhesions, renders the part so effected much less liable to subsequent attacks of the same disease; and when it occurs, the inflammation and effusion do not extend to the adherent parts.

Among the occasional causes of pleurisy, enumerated by Laennec (after Celsus), are,—long exposure to cold after violent exercise; metastasis of gout, rheumatism, and cutaneous diseases; blows on the chest; and fracture of the ribs. 'The winter season,' says Aretæus, 'is most liable to produce this disease, and next to it the autumn; the spring is less so, unless it chance to be a cold one, while the summer is the least so of all.' In reference to the period of life, he remarks that old people are more liable to it than those who are in the prime of life; and these again than children. Among predisposing causes, Laennec mentions a slender frame, narrowness of the chest, the immoderate use of spirits, and tubercles in the lungs.

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[*] The word πλευρῖτις is generally said to be derived from πλευρά, *the pleura*, but (as far as the writer is aware) the word πλευρὰ is never used by the antient medical writers in that sense. That which is called *the pleura* by modern anatomists is called ὑπεζωκὼς ὕμην, or simply ὑπεζωκὼς by Aretæus (*De Caus. et Sign. Morb. Acut.*, lib. i., cap. 10, p. 20, ed. Kühn), Aetius (lib. viii., cap. 76, p. 175. B., ed. Ald.), Alexander Trallianus (lib. vi., cap. 1, p. 85, ed. Steph.), and Paulus Ægineta (lib. iii., cap. 33, p. 41, B., ed Ald.). Galen uses the same word in more than one place, and with regard to its meaning says (*De Anatom. Administr.*, lib. vii., cap. 2, p. 591, ed. Kühn), 'As the other membrane is called the peritonæum (περιτόναιον), because it is extended around (ἀπὸ τοῦ περιτετάσθαι) the alimentary vessels, so this (i e. *the pleura*) is called ὑπεζωκὼς, because it fastens together internally (ἔσωθεν ὑπέζωκε) the whole of the ribs.'

Pleurisy terminates either in resolution, suppuration, or gangrene. The former is the ordinary and most favourable issue. The last occurs rarely, and Laennec has seen only one instance of it from acute inflammation. Suppuration however is by no means uncommon, in which case, says Aretæus, 'shivering fits ensue, and lancinating pains, accompanied with a desire to sit in an upright posture; the breathing gets worse, and there is great fear lest the lung, by suddenly drawing in the purulent matter, should produce suffocation, after the previous and greater danger has been escaped; should the matter however burrow between the ribs and separate them, and either point externally or burst into the bowels, the patient usually recovers.'

With respect to the treatment, perhaps there is no disease in which profuse bleeding from a large orifice may be so fully depended upon, or has been so generally acceded to by practitioners of all ages and all nations; the only question which has ever arisen upon the subject being, whether the blood should be taken from the side affected, or from the opposite. Hippocrates and most of the earlier Greeks recommended the former, while the latter method was practised by Archigenes (*ap. Aëtium*, tetrab. ii., serm. 4, cap. 68), Avicenna (*Canon*, lib. iii., fen. 10, tract. 5, cap. 1), Avenzoar (*Teisir*, lib. i., tract. 16, cap. 3, p. 23, D., ed. Venet., 1549), and their followers in the middle ages. The dispute, which is one of those that have been settled by the discovery of the circulation of the blood, was before that time (as may easily be imagined) considered to be of the greatest consequence, and at the beginning of the sixteenth century raised a kind of civil war (as Bayle says) among the Portuguese physicians on account of the controversy between Denys and Brissot, the particulars of which are too curious to be altogether omitted. The dispute was brought at last before the tribunal of the university of Salamanca, where it was canvassed in a most profound manner by the body of physicians; but in the meantime the partisans of Denys, who were the more powerful, obtained a decree from the civil authorities forbidding physicians to bleed on the same side on which the pleurisy was. At last the university of Salamanca gave judgment, and decided that Brissot's opinion was the pure doctrine of Hippocrates and Galen. The other party removed the cause before the emperor Charles V., 1529; and were not satisfied with exclaiming against the doctrine of Brissot as false, but declared it to be impious and deadly, and that it was no less pernicious to the body than Luther's schism to the soul. Unluckily for them just about this time Charles III., duke of Savoy, happened to die of a pleurisy, after having been bled pursuant to the practice which Brissot had opposed. This put a stop to the appeal to the emperor, but books were written on the question in all parts of Europe, and the practice of the Arabians was generally condemned. A list of these treatises is given by René Moreau, in the Life of Brissot, prefixed to his edition of his work 'De Incisione Venæ in Pleuritide Morbo,' &c. Paris, 1622, 8vo. (See Bayle, art. 'Brissot,' from whom the above account is abridged.)

Besides blood-letting (which may be repeated at proper intervals, as long as the pain remains), the usual antiphlogistic remedies, such as saline diuretics, diaphoretics, purgatives, mercurials, blistering, &c., may be employed; in cases of acute pleurisy the operation of paracentesis thoracis is very seldom had recourse to, and is hardly ever attended with more than a temporary relief.

Chronic pleurisy is either the continuation, as it were, of the disease in its acute form, or else exhibits at no period either the intense fever, the violent pain, or energy of reaction which characterise an acute disease. In this latter form it creeps on very insidiously, without much acceleration of pulse or heat of skin; the pain in the side amounts to no more than a mere soreness; and the difficulty or hurry of breathing is sometimes so inconsiderable as not to attract the individual's attention. However, his unhealthy pallid appearance, his loss of appetite, and languid look emphatically tell of mischief going on, and upon close examination it is found that the absence of fever is not constant, but that towards evening there is a febrile movement.

The anatomical characters of chronic pleurisy do not differ very widely from those of the acute form, especially when it has been a mere transition of one form of the disease into the other. The fluid effused however partakes more of a purulent character, and the false membrane is firmer and more condensed, owing perhaps to the longer time it has been under the pressure of the effused fluid. The lung too is more compressed than in acute pleurisy, so much so that there is sometimes a complete annihilation of its vesicular structure, and the organ itself is reduced to a thin lamina, not exceeding six lines in thickness, lying down along the spine.

The prognosis of chronic pleurisy is, generally speaking, very unpromising: in the ordinary course of the disease a slow wasting fever sets in; there is a gradual emaciation; the appetite fails; the pulse is languid, although not much quickened; the legs swell, and the face becomes puffed; the expectoration often has a disagreeable alliaceous smell. Under these symptoms well-defined hectic fever soon supervenes, and rapidly wears down the patient.

The treatment of chronic pleurisy differs (as might be supposed) very materially from that of the acute form of the disease. Blood-letting is hardly ever resorted to, for the weakened habit of body will not bear the exhaustion of it. For promoting the absorption of the effused fluid, as well as for preventing its further secretion, external applications, comprehending the different modifications of counter-irritation, *e.g.* blisters, setons, issues, stimulating liniments, &c., appear to be most efficacious. In some cases however the operation of paracentesis thoracis seems to be the last resource, and this so often fails that it is by some practitioners considered an almost hopeless experiment. In trying to improve the habit of body and to relieve the constitutional symptoms, which most commonly accompany this form of the disease, recourse must be had to a nutritious but not a heating or exciting diet, and to the cautious exhibition of such tonics as the patient is able to bear. Change of air is often productive of the most decided benefit, and sometimes effects an almost instantaneous amelioration in the symptoms, by causing the night perspirations to cease, the appetite to improve, and the sleep to become refreshing.

(See, besides Good, *Study of Med.*, and Law, art. 'Pleurisy,' in *Cyclop. of Pract. Med.* (from which two works much of this article is abridged), Cruveilhier, art. 'Pleurésie,' in *Dict. de Méd. Prat.*, 1835, and Laennec *On Diseases of the Chest*, translated by Forbes. Besides the antient authors already quoted, the following references are given by Mr. Adams, in his 'Commentary to Paulus Ægineta:' Celsus, *De Med.*, lib. iv., cap. 6; Psellus, *De Vict. Ratione;* Oribasius, *Collecta Medicin.*, lib. ix., cap. 7, 8; Joannes Actuarius, *Meth. Med.*, lib. iv., cap. 4; Theophanes Nonnus, cap. 129; Cælius Aurelianus, *De Morb. Acut.*, lib. ii., cap. 13; Octavius Horatianus, *Rer. Med.*, lib. ii., cap. 4; Marcellus Empiricus, *De Medicam.*, cap. 24; Serapion, *Pract.*, ii. 21; Mesue, *De Ægrit. Pect.*, cap. 7; Alsaharavius, *Pract.*, lib. xii., cap. 8; Haly Abbas, *Theor.*, lib. ix., cap. 21; *Pract.*, lib. vi., cap. 13; Rhazes, *Lib. Divis.*, cap. 54; *Contin.*, lib. x.)

A very complete list of works on the subject of Pleurisy is given in Ploucquet, *Literatura Medica Digesta*, 4 vols. 4to., Tübing., 1808-9; and a selection in the Appendix to the *Cyclop. of Pract. Med.*

PLEUROBRANCHÆA. [SEMI-PHYLLIDIANS.]

PEUROBRANCHUS. [SEMI-PHYLLIDIANS.]

PLEURODICTYUM. Goldfuss employs this term for a species of coral? from the transition rocks of the Hundsruck. (*Petrefacten*, tab. 38, f. 18.) It is said by Mr. Austen to occur in Devonshire.

PLEURODONTS. MM. Duméril and Bibron make their *Iguaniens Pleurodontes* the first subfamily of the *Iguanian Lizards*, or *Sauriens Eunotes*.

This tribe corresponds to that designated by Wagler under the names of *Pachyglossæ platycormæ* and *Stenocormæ Pleurodontes*, and by Wiegmann under those of *Pachyglossæ Dendrobatæ* and *Humivagæ Prosphyodontes*.

The maxillary teeth of the species composing the *Pleurodonts* have their summit, or free and enamelled part, more or less trilobated. There are only some genera in which the teeth are dentilated on the edges; nearly all have the palate armed with teeth, disposed in one or two rows on each side. Sometimes the tympanic membrane is stretched on the level of the auditory conduit, whose edge is either simple or dentilated, and sometimes it is a little sunk within it. None of the known species are without an external ear. Among these *Pleurodont Iguanians* alone are met with species whose toes are enlarged nearly in the same manner as in some of the *Geckos*. [Gecko.] All the *Pleurodont Iguanians*, with the exception of one genus only (*Brachylophus*), are natives of the New World.

The following genera are arranged under this subfamily by MM. Duméril and Bibron:—

1. *Polychrus*, Cuv. *Generic Character*.—Skin of the lower region of the neck forming a longitudinal fold, or a sort of small dewlap, dentilated in front. Palatine teeth. Femoral pores. Fourth toe of the same length as the third. Scales of the body entirely or partially imbricated and carinated. Tail not prehensile. Neither dorsal nor caudal crest.

2. *Læmanctus*, Wiegm. *Generic Character*.—Skin of the lower region of the neck forming a transversal fold in front of the breast. Neither palatine teeth nor femoral pores. Fourth toe longer than the third. All or part of the scales of the body imbricated and carinated. Tail not prehensile. Neither back nor tail crested.

3. *Urostrophus*, Dum. and Bib. *Generic Character*.—Skin of the lower region of the neck forming a transversal fold in front of the breast. Palatine teeth. No femoral pores. Fourth toe longer than the others. All the scales of the body smooth; those of the belly flat and imbricated; the others convex and in juxta-position. Tail prehensile.

4. *Norops*, Wagl. *Generic Character*.—Skin below the neck forming a projecting fold, or a sort of small non-dentilated dewlap. No palatine teeth nor femoral pores. Fourth toe longer than the third. Scales of the body carinated, imbricated in part; those of the sides much smaller than those of the back and belly. Tail moderate, not prehensile, without a crest, like the back.

5. *Anolis*, Daud. (*Anolis*, Merr.; *Anolius*, Cuv.; *Dactyloa*, Wagl.; *Draconura*, Wagl. and Wiegm.; *Xiphosurus*, Fitzing.). *Generic Character*.—Toes dilated under the antepenultimate phalanx, forming a suboval disk more or less enlarged, furnished with imbricated scaly lamellæ. Under the neck a *goître*, which, when it is not expanded, takes the form of a more or less developed dewlap. Palatine teeth. No pores to the thighs.

The species are numerous. MM. Duméril and Bibron record twenty-five.

6. *Corythophanes*, Boie (*Corythophanes*, Wiegm., Gravenhorst; *Chamæleopsis*, Wiegm., Graven., Gray). *Generic Character*.—Toes not dilated, nor fringed on their external border. Posterior part of the cranium more or less elevated into a sort of casque. Palatine teeth. Tail long, somewhat rounded or very feebly compressed, without a crest. Back, and sometimes the nape, crested. Under the neck a transversal fold, in front of which is a rudiment of a dewlap, which is sometimes denticulated. No femoral pores.

7. *Basiliscus*, Laur. (*Basiliscus*, Wiegm.; *Corythæolus*, Kaup.; *Œdicoryphus*, Wagl.). *Generic Character*.—A fragment of triangular skin elevating itself vertically above the occiput. External edge of the posterior fingers furnished with a scaly dentilated fringe. Back and tail surmounted sometimes (in the males) with an elevated crest, sustained in its thickness by the spinous or upper apophyses of the vertebræ. Under the neck a rudiment of a dewlap, succeeded by a well-marked transversal fold. Palatine teeth. No femoral pores. [Basilisk.]

8. *Aloponotus*, Dum. and Bib. *Generic Character*.—Skin of the upper part of the trunk without scales. A small dewlap, without dentilations. Tail compressed, furnished with great carinated verticillated scales. Two rows of femoral pores. Palatine teeth. Maxillary teeth with a trilobated summit. A very low dorsal and caudal crest. Cephalic plates small, equal, flat, and polygonal.

9. *Amblyrhynchus*, Bell (*Amblyrhynchus*, Gray and Weigm., but not Wagler). *Generic Character*.—Body covered with scales elevated into tubercles. Throat dilatable, but without a dewlap. Tail compressed towards its extremity, and furnished with great verticillated scales. A row of pores under each thigh. Palatine teeth? Maxillary teeth lateral, with a trilobated summit. A rather high paleaceous crest on the back and tail. Head covered with unequal tubercles, with a polygonal base. Toes stout and short.

10. *Iguana*, Laur. (*Hypsilophus*, *Amblyrhynchus*, Wagl.). *Generic Character*.—A very large delicate dewlap under the neck. Cephalic plates polygonal, unequal in diameter, flat or carinated. A double row of small palatine teeth. Maxillary teeth with their edges finely dentilated A crest on the back and tail. Toes long and unequal. A single row of femoral pores. Tail very long, slender, compressed, covered with small, equal, imbricated, carinated scales. [Iguana.]

11. *Metopoceros*, Wagl. (*Iguaan*, Cuv.). *Generic Character*.—Throat dilatable, but without a dewlap. Some tuberculose plates on the muzzle. Palatine teeth. Maxillary teeth with a tricuspidate summit. Back and tail crested. A double row of femoral pores. Tail long, compressed, covered with equal scales, which are imbricated and carinated, but not spiny.

12. *Cyclura*, Harlan (*Iguana*, Cuv. and Merrem, part; *Ctenosaura*, Wiegm. and Gray, part; *Cyclura*, Wagl., Wiegm., Gray.). *Generic Character*.—Skin of the throat loose, plaited across, but without the true dewlap of the *Iguanæ*. Cephalic plates angular, flat, or convex. Palatine teeth. Maxillary teeth with a trilobated summit. A single row of femoral pores. Back and tail crested; the last more or less compressed, furnished with verticillated scales, alternating with rings of spines.

13. *Brachylophus*, Cuv. *Generic Character*.—Skin of the throat loose, slightly pendulous longitudinally. Cephalic plates very small, polygonal, equal, and flattened. Scales of the upper part of the trunk granulous. Palatine teeth. Maxillary teeth dentilated on the sides. A single row of pores under each thigh, a very low crest running the whole length of the back. Tail very long, very slender, compressed at its base, rounded throughout the rest of its extent, furnished with small, equal, carinated, imbricated scales, and without a crest.

14. *Enyalius*, Wagl. (*Ophryoëssa*, part, Gray, Wiegm.). *Generic Character*.—Head short, covered with small, equal, polygonal plates. A dorsal crest. Palatine teeth. No femoral pores. Tail rounded, without a crest.

15. *Ophryoëssa*, Boie. • *Generic Character*.—Head short, covered above with small polygonal plates, nearly similar to each other in figure and diameter. Nostrils lateral. Sincipital plate small. Palatine teeth. No femoral pores. Tail pressed throughout its length, and surmounted, as well the back, with a dentilated crest. Skin of the throat forming a not very perceptible fold, behind which is a strongly marked transversal one.

16. *Leiosaurus*, Dum. and Bib. *Generic Character*.—Head short and depressed, covered with very small flat or convex scales. No crest on the upper part of the body. Palatine teeth. No femoral pores. Tail short, rounded. Anterior toes short, stout, subcylin drical, furnished below with a row of smooth or carinated scales.

17. *Uperanodon*, Dum. and Bib. (*Plica*, Gray, part; *Hypsibatus*, Wagl., part). *Generic Character*.—Head short, rounded anteriorly, covered with scales unequal in diameter; a large occipital scale; great subocular scutella. Nostrils lateral. No palatine teeth. A well-marked transversal fold, preceded by another which is longitudinal and hardly perceptible. Trunk subtriangular, not plaited laterally, surmounted by a small crest, and covered with imbricated carinated scales. Tail moderately long, rounded, without a crest. No femoral pores.

18. *Hypsibatus*, Wagl. (*Plica*, Gray). *Generic Character*.—Head depressed, rounded anteriorly, covered with unequal plates; a great occipital scale; great subocular plates. Nostrils lateral. Palatine teeth. A longitudinal fold under the throat; another transversal fold in front of the breast. Trunk a little depressed, with two longitudinal folds on each side of the back. Bundles of spines on the nape and round the ears. A dorsal crest. Scales of the body carinated and imbricated. Tail rounded or compressed. No femoral pores.

19. *Holotropis*, Dum. and Bib. (*Tropidurus*, Fitzing., part; *Leiocephalus*, Gray). *Generic Character*.—Head in the shape of a quadrangular pyramid. Cephalic plates moderate, angular, nearly equal; a very small occipital plate; subocular scutella dilated across; the other plates oblong. Palatine teeth. Neck smooth below, plaited irregularly on the sides. An oblique fold of the skin before each shoulder. Anterior border of the ear dentilated. Trunk subtrihedral, covered with imbricated scales of moderate size, surmounted with carinations finishing in a sharp point, and forming oblique lines converging towards the middle of the back. A dentilated crest extended from the nape to the extremity of the tail, which is long and compressed. External border of the first two or three posterior fingers dentilated. No pores at the cloaca nor on the thighs.

20. *Proctotretus*, Dum. and Bib. (*Tropidurus* (*Leiolæmus*),

Wiegm.). *Generic Character.*—Head subpyramidal, quadrangular, more or less depressed. Cephalic plates moderate, polygonal; occipital plate in general not very distinct. Palatine teeth. Neck plaited on the sides, or entirely united. Membrane of the tympanum rather sunk. Body rounded or slightly depressed, covered with imbricated scales, the upper ones carinated, the lower smooth. Neither caudal nor dorsal crest. Toes simple. Tail long and conical, or moderate and slightly depressed. No femoral pores; anal pores in the males.

21. *Tropidolepis*, Cuv. (*Sceloporus*, Wiegm.; *Tropidurus*, part, Wagl.). *Generic Character.*—Head short, flattened, rounded in front; a great occipital scale and large subocular plates. No palatine teeth. Below the neck on each side a sort of oblique slit. Trunk short, depressed, with imbricated scales, carinated on the back, smooth under the belly. No dorsal nor caudal crest. Tail stout, not much elongated, depressed at the base, rounded after. Femoral pores, but no anal pores.

22. *Phrynosoma*, Wiegm. (*Agames orbiculaires*, Daud., part; *Tapayes*, Cuv., Fitzing.). *Generic Character.*—Head short, rounded anteriorly, bordered posteriorly and laterally with large and strong prickles. Cephalic plates polygonal, equal; a small subcircular occipital plate. No palatine teeth. Beneath the neck plaited transversely. Border of the ear simple. Trunk short, oval, very much depressed, offering on each side a squamous dentilated arête. Upper part bristling with trihedral tubercles springing in the middle of small imbricated scales. Neither dorsal nor caudal crest. Limbs very short; toes but little developed, dentilated on their borders. Tail hardly so long as the trunk, flattened, very wide at its root. A line of pores on each thigh.

23. *Callisaurus*, Blainv. *Generic Character.*—Head short, depressed, rounded anteriorly, covered with unequal plates; a very much dilated occipital scale, and great subocular scutella, which are nearly square. Nostrils situated on the muzzle. No palatine teeth; all the maxillary teeth simple and conical. A longitudinal fold under the throat, followed by another which is transversal. Foldings on the sides of the neck. Borders of the auditory holes simple. Trunk not much elongated, compressed, enlarged on each side by a development of the skin. Scales of the body small, numerous, serrated, imbricated, united. Neither dorsal nor caudal crest. Tail long, flattened, wide at its origin, narrowed throughout the rest of its extent. Limbs but little developed; toes very long and very narrow; nails very loose (effilés). A long row of pores upon each thigh.

24. *Tropidogaster* (Dum. and Bib.). *Generic Character.*—Head short, triangular, obtuse anteriorly. Subocular regions covered with a great number of polygonal plates much smaller than the other cephalic scales, and carinated like them. A moderate occipital scutellum. Nostrils lateral, tubular. No palatine teeth. Throat with two or three transverse entire folds. One or two longitudinal plates on the sides of the neck. Membrane of the tympanum a little sunk. Anterior border of the ear subdenticulated. Trunk very slightly depressed; a fold of the skin along each side. Scales of the back small, unicarinated, and with their borders, as it were, swollen; scales of the belly with three carinations. A small dentilated crest from the occiput to the end of the tail, which is long, subconical, very slightly depressed at its base, and surrounded with verticillated carinated scales. Toes and nails slender, very loose (effilés). No femoral pores.

25. *Microlophus*, Dum. and Bib. (*Tropidurus*, part, Wiegm.). *Generic Character.*—Head subpyramido-quadrangular, depressed, with plates unequal in diameter; a very dilated occipital scale; great subocular scutella. Nostrils lateral and rather tubular. Palatine teeth. Many cross folds under the neck. In front of each shoulder an arched fold descending on the breast, without uniting itself with that which is opposed to it. Anterior border of the ear dentilated. Trunk elongated, slightly rounded, with subimbricated scales slightly carinated or united on the back, tiled and smooth under the belly. Skin of the side of the body forming two longitudinal folds. A very low dentilated or tubercular crest extending from the nape to the extremity of the tail, which is long, subconical, and with carinated subverticillate scales. No femoral pores.

26. *Ecphymotes*, Cuv., not Fitzing. (*Tropidurus*, Wied., Wiegm., Wagl., part; *Oplurus*, Gray, part). *Generic Character.*—Head triangular, depressed, covered with unequal plates; a rather dilated occipital scale; moderate subocular scutella. Nostrils rather lateral, slightly tubular, and directed backwards. A single transversal plate beneath the neck, and two strongly marked ones on each side. Palatine teeth. Trunk not much elongated, depressed, with small imbricated scales; the under ones smooth; those above surmounted with carinæ, forming converging lines towards the medio-longitudinal region of the body. Neither dorsal nor caudal crest. Limbs of moderate length. Tail rather long, strong, conical, with subverticillate scales, which are imbricated and carinated. No femoral pores.

27. *Stenocercus*, Dum. and Bib. *Generic Character.*—Head depressed, triangular, elongated, covered with small equal plates; occipital scale hardly distinct; subocular scutella forming many longitudinal rows. Palatine teeth. Nostrils sublateral, tubular, directed backwards. A curvilinear cutaneous fold before each shoulder. No transversal folds under the neck, the sides of which are plaited longitudinally. A very small dentilated crest extending from the nape to the tail. Trunk rather elongated, subtrihedral, with imbricated scales, smooth below, offering above carinæ disposed in oblique lines; tail rather long, compressed, surrounded with verticillations formed by great spiny scales. No femoral pores.

28. *Strobilurus*, Wiegm. *Generic Character.*—Head depressed, covered with a great occipital plate, surrounded with a great number of small scutella. No palatine teeth. Membrane of the tympanum rather sunk; anterior border of the ear dentilated. An oblique plait of the skin before each shoulder; ramified plications on the lateral parts of the neck. Trunk subtrihedral, with moderate scales, which are imbricated, carinated on the back, smooth under the belly. The *arêtes* of the upper scales forming oblique lines converging towards the rachidian region. A dentilated keel extending from the neck to the base of the tail, which is moderate, rather compressed, and covered with great spiniferous scales. No femoral pores.

29. *Trachycyclus*, Dum. and Bib. *Generic Character.*—Head quadrangularly pyramidal, flattened, covered with nearly equal plates; occipital scale very small. Nostrils rather lateral. No palatine teeth. An arched fold before each shoulder. Skin of the lower part of the neck tense; those of the sides plaited longitudinally; cervical, dorsal, and caudal regions without a crest. Trunk nearly round, with the scales rather large, imbricated, carinated above, smooth below. Tail of moderate length, subconical, very slightly depressed at its base, surrounded with verticillations of spines. No femoral pores.

30. *Oplurus*, Cuv. (*Tropidurus*, Wiegm., Fitzing., Gray, part). *Generic Character.*—Head triangular, but little elongated, thick, furnished with plates of moderate size; occipital plate moderate; subocular plates smaller than the others, and disposed in many rows. Nostrils rather lateral and tubular. Palatine teeth. Membrane of the tympanum sunk in the ear, the anterior border of which last is dentilated. A transversal fold at the origin of the breast ascending on each shoulder, and sometimes preceded by two others. Neck surmounted by a very small crest. Trunk short, wide, with smooth or carinated scales. Tail stout, of moderate length, slightly conical, surrounded by verticillations formed by great and strong spiny scales. No femoral pores.

31. *Doryphorus*, Cuvier (*Urocentron*, Kaup, Wagl., Wiegm.). *Generic Character.*—Head short, triangular, flattened anteriorly. A great occipital plate; scales polygonal, small, nearly equal on the rest of the cranium No palatine teeth. Under the neck a double transversal entire fold. Ears not dentilated. Nasal plates nearly lateral and convex. No crest on the upper part of the body. Trunk short, depressed, convex above, plaited longitudinally on the sides, and with small imbricated smooth scales. Tail but little elongated, stout, flattened, surrounded with strong spiny verticillated scales. No femoral pores.

The generic characters of this extensive subfamily here given are those of MM. Duméril and Bibron. A few of the most remarkable forms have already been illustrated in this work. [IGUANIDÆ.]

PLEURODY'NIA (from πλευρά, the side, and ὀδύνη, pain—pain of the side), called also 'false pleurisy.' The term includes all those pains of the side which are unconnected with pleuritic inflammation, whether arising from a rheumatic affection of the intercostal muscles, neuralgia in the same parts, or any other cause not evidently pleuritic.

PLEURONE'CTIDÆ, a family of fishes of the order Malacopterygii and section Subbrachiales. This family contains the Soles, Flounders, and Turbots, and some other fishes, all of which are readily distinguished by the flattened form of the body and in having both the eyes on one side. This want of symmetry in the form of the head, Cuvier states, is unique amongst vertebrate animals. The side of the body which is uppermost is always coloured, and might be mistaken for the back of the fish, whilst the opposite side is white. The two sides of the mouth are unequal, and it is uncommon to find the two pectoral fins equal; the dorsal and anal fins extend the whole length of the back and abdomen respectively; the ventrals appear like a continuation of the anal; the branchiostegous membrane has six rays.

The *Pleuronectidæ* are divided into the following genera:—

Genus 1. *Platessa*, in which the jaws are each furnished with a single row of obtuse teeth; on the pharyngeans are generally some teeth like paving-stones; the dorsal fin is only extended in front to a line with the eye, and leaves, as well as the anal, an interval between it and the caudal. The form of the body is rhomboidal, and the eyes are usually on the right side.

To this genus belongs the common Plaice (*Platessa vulgaris*, Cuv.), which is usually about a foot or rather more in length; of a brown colour above, spotted with red or orange; on the eye side of the head are some osseous tubercles; the lateral line is curved above the pectoral fin; the body is smooth, and the teeth are blunt and contiguous.

This fish is very abundant on various parts of the British coast, and is said sometimes to attain the weight of fifteen pounds.

The Flounder (*P. Flesus*), Dab (*P. Limanda*), and Lemon Dab (*P. microcephala*), are also examples of the genus *Platessa*.

Genus 2. *Hippoglossus*, Cuv. The species of this genus differ from the Plaices proper in having the body usually more elongated, and the jaws and pharyngeans armed with strong and pointed teeth.

The Holibut (*Hippoglossus vulgaris*, Flem.) is not uncommon on some parts of our coast, and is often exposed for sale in the London market. It is usually of large size. One specimen, taken in the Isle of Man, is said to have measured seven feet and a half in length. In the northern parts of Britain it is called the *Turbot:* the Holibut however is of a much longer form than the Turbot, and by no means equal to it in flavour.

Genus 3. *Rhombus*, Cuv. The species of this genus have the jaws and pharyngeans furnished with thickly set small pointed teeth; the dorsal fin commences immediately above the upper lip, and this fin, as well as the anal, extends very nearly to the tail. the eyes are generally on the left side.

The Turbot, Brill, Muller's Topknot, Bloch's Topknot, the Whiff, and the Scaldfish are British examples of the genus *Rhombus*.

The Turbot (*Rhombus maximus*, Cuv.), next to the Holibut, is one of the largest of the *Pleuronectidæ* found on our coast, and is the most highly esteemed for the table. The Turbot is of a short and broad form, and rather deeper than many of the flat fishes. Its prevailing colour is brown, and the whole of the coloured side is studded with hard and roundish tubercles; the lateral line is considerably arched above the pectoral fin, and thence runs straight to the tail: it is called in Scotland the Rawn Fleuk and Bannock Fleuk.

'On the coasts of Durham and Yorkshire,' says Mr. Yarrell, 'a considerable fishery of Turbot is carried on by the fishermen of Hartlepool and Scarborough with long lines.

'A large portion of the Turbot produced in the English market is taken on or near the various sand-banks between the long line of our eastern shore and the coast of Holland.'

The Brill (*Rhombus vulgaris*, Cuv.) is very similar to the Turbot in appearance, but inferior in flavour; it is common in the markets, and may at once be distinguished by its less broad form, the want of the osseous tubercles on the coloured side of the body, and the colouring, which is reddish or sandy brown varied with darker brown, and minutely spotted with white. It is moreover a smaller fish.

Genus 4. *Solea*, Cuv., contains the Soles, which are distinguished generally by their more elongated form and the blunt and rounded shape of the muzzle. The eyes, as well as the colouring, are on the right side; the teeth are small and confined to that side of the mouth which is opposed to the eyes; the dorsal fin commences in front of the line over the eyes, and extends, as well as the anal, to the tail-fin.

Cuvier separates as a subgenus from the Soles proper those species which have the pectoral fin on the side with the eyes very small, and that on the opposite side either rudimentary or altogether wanting. They are termed *Monochirus*.

The common Sole (*Solea vulgaris*, Cuv.) inhabits the sandy shore all round our coast, where it keeps to the bottom, and feeds upon small testaceous animals and the fry of other fishes; as they will not readily take bait, they are almost entirely caught by trawling. 'Eighty-six thousand bushels of Soles were received at Billingsgate-market only within the last twelve months.' (Yarrell's *British Fishes*, vol. ii., p. 25.)

Another species belonging to this section, called the Lemon Sole (*Solea pegusa*, Yarrell), is occasionally taken with the common species, from which it differs in being rather broader and of a yellowish colour.

Of the subgenus *Monochirus*, one species is found on the British coast, and is known by the names Variegated Sole, Red-backed Flounder, &c. (*M. linguatulus*). There are moreover certain Soles in which the pectoral fins are altogether wanting; they constitute the subgenus *Achirus* according to Lacépède.

PLEURO'PTERA, the name of a tribe of quadrupeds generally known as Flying Lemurs (*Galeopithecus* of Pallas; Flying Cats and Flying Foxes of voyagers). They are generally arranged under the order Carnassiers, and some authors place them in the division *Cheiroptera;* but they differ from the *Bats* inasmuch as the toes of their anterior extremities, which are all furnished with sharp claws, are not more elongated than those of the hind feet, so that the membrane which occupies the interval between the extremities to the sides of the tail can hardly operate in executing more than the functions of a parachute.

Dental formula:—Incisors, $\frac{4}{6}$; canines, $\frac{0-0}{0-0}$; molars, $\frac{6-6}{6-6} = 34$.

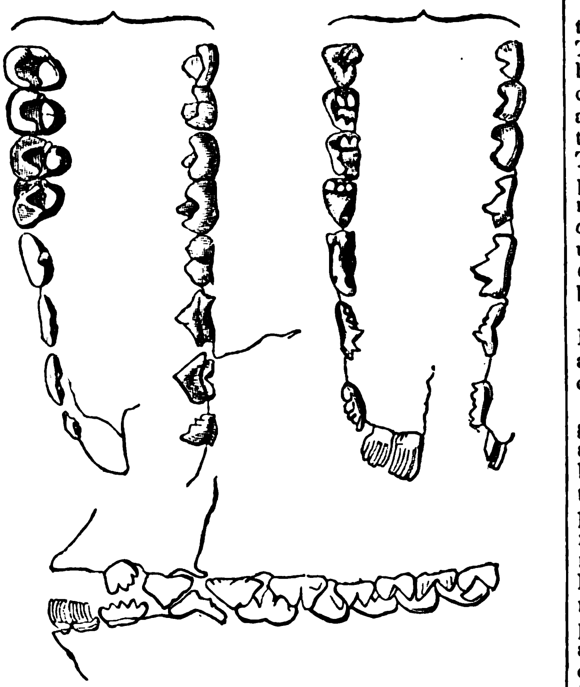
This is the formula given by M. Lesson; but Cuvier, in his *Règne Animal*, states that the canines are dentilated and short like the molars. He states that the two upper incisors are also dentilated and much separated from each other; and that the six lower ones are split into narrow strips like combs, a structure peculiar to this genus.

M. F. Cuvier's formula is similar to that of M. Lesson, and was probably copied by the latter. M. F. Cuvier describes the 12 molars in both jaws as consisting of four false molars and eight molars. He tells us that in the upper jaw, the intermaxillary bone, though very extensive, has no teeth in its anterior part, in the posterior part there are two on each side. The descending line in the upper part of the lower figure marks the extent of the intermaxillary bone.

The dentition, as it appears to Mr. Waterhouse, is as follows:—

Incisors $\frac{2-2}{4}$; canines $\frac{0-0}{1-1}$; false molars $\frac{2-2}{2-2}$; true molars $\frac{4-4}{4-4} = 34$.

The same author observes that the six foremost teeth in the lower jaw of the *Lemur* (four only of which are, in his opinion, incisors; for he agrees with Geoffroy in considering the remaining two as canines) together bear a remarkable resemblance to a single incisor of *Galeopithecus*. He compares the two canines to the outer *laminæ* of one of these incisors. Like one of these *laminæ*, the *Lemur's* canine is dilated immediately above the base, and has a longitudinal ridge on the upper side, whilst the incisors, like the intermediate *laminæ*, are grooved on the outer side near the apex. In their almost horizontal direction there is also a resemblance. In the number of teeth the *Galeopitheci* agree with the *Lemurs*, excepting that in the former the upper canines are wanting. In both these groups of animals the incisors of the lower jaw are, he observes, opposed to a toothless portion of the intermaxillaries. (*Zool. Trans.*, vol. ii., part 4.)



Teeth of Galeopithecus, one-third larger than nature. (F. Cuvier.)

Geographical Distribution of the Genus, Habits, &c.—Cuvier and others state that the *Galeopitheci* live on trees in the islands of the Indian Archipelago, and there pursue insects, and perhaps birds, as their prey: judging from the detrition of the teeth with age, he thinks that they must also feed on fruits. They have a very large cæcum. In their teeth they present many analogies to the *Lemuridæ*.

Mr. Gray makes the *Galeopithecidæ* the fourth family of the (quadrupedoid) *Primates*, and places it between the *Lemuridæ* and *Vespertilionidæ*. (*Outline, &c.*, in *Ann. of Philosophy*, 1825.)

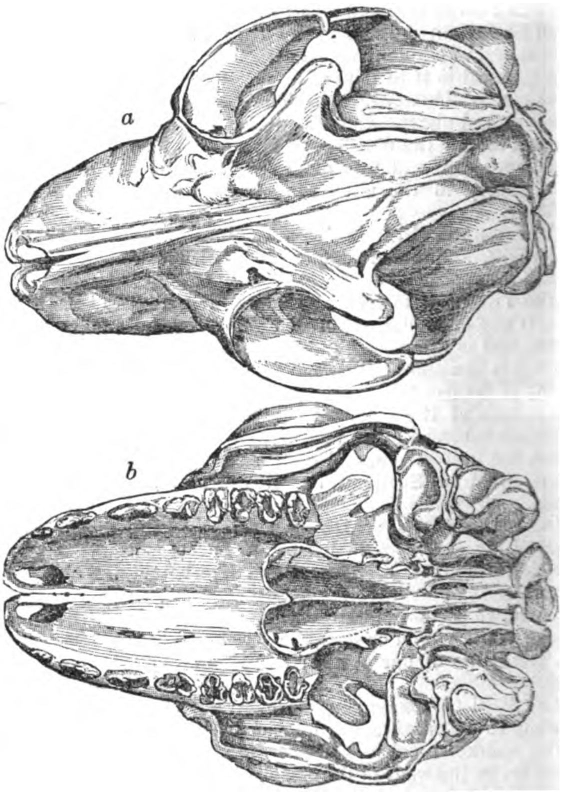
Speaking of the *Galeopithecus* of Pallas, Mr. Swainson observes: 'To give its most striking character in a few words, it is a lemur, with the limbs connected by a bat-like membrane, or, in other words, surrounded by a thin skin which they support, as the framework of an umbrella supports its covering. By this singular structure, the animal is supported in the air; yet without the power, like the bats, of sustaining a continued flight. Linnæus places this remarkable genus with the lemurs, while every one must perceive its intimate affinity to the bats; like them also, these bat-lemurs are nocturnal and insectivorous; the mammæ are pectoral; and they sleep suspended by their hind legs with their heads downward. M. Geoffroy St. Hilaire therefore justly considers them as the form by which the lemurs and bats are connected; while their greater resemblance to the former induces us to consider *Galeopithecus* as one of the aberrant types of the *Lemuridæ*,' among which Mr. Swainson arranges the genus, in the third part of his volume, between *Aötes* and *Cheirogaleus*. (*Natural History and Classification of Quadrupeds*, 1835.)

Three species have been recorded: 1, *Galeopithecus rufus*, Geoff., Audeb. (*Lemur volans*, Linn.); 2, *Galeopitherus variegatus*, Cuv., Geoff.; 3, *Galeopithecus Ternatensis*, Geoff.: but the general opinion seems to have been that one only, the *Lemur volans* of Linnæus, had been satisfactorily made out. In October, 1838, some specimens of Flying Lemurs were upon the table at a meeting of the Zoological Society of London, and in reference to them Mr. Waterhouse pointed out certain characters which appeared to him to indicate the existence of two species in those specimens.

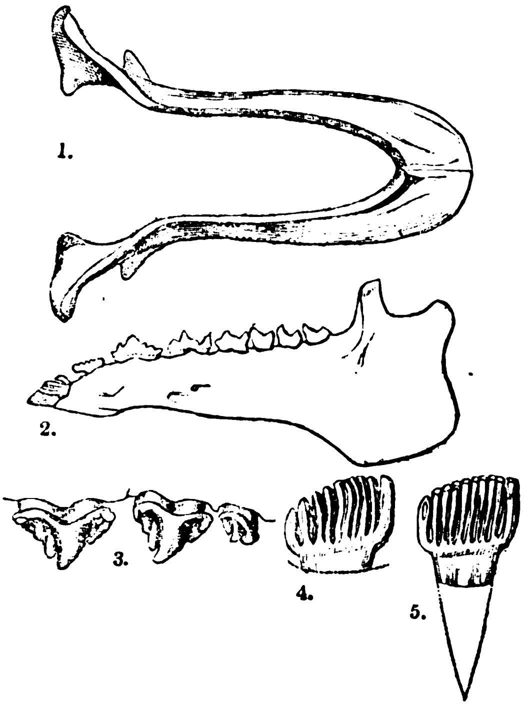
He remarked that in systematic works three species of the genus *Galeopithecus* are described, founded upon differences of size and colour: as regards the latter character, he had never seen two specimens which precisely agreed; and, with respect to size, the dimensions given of two out of the three species are, he observed, evidently taken from extremely young animals. Mr. Waterhouse then proceeded to distinguish the two species on the table, and proposed for them the specific names of *Temminckii* and *Philippinensis*.

The first and larger species measured about two feet in total length, and its skull was 2 inches 11½ lines in length. The anterior incisor of the upper jaw is broad, and divided by two notches into three distinct lobes; the next incisor on each side has its anterior and posterior margins notched; and the first molar (or the tooth which occupies the situation of the canine) has its posterior edge distinctly notched. This tooth is separated by a narrow space, anteriorly and posteriorly, from the second incisor in front and the second molar behind; the temporal ridges converge towards the *occiput*, near which however, he observed, they are separated usually by a space of about four lines. This is probably the *Galeopithecus volans* of authors; but the identity cannot be said to be certain.

The second species, *G. Philippinensis*, was described by Mr. Waterhouse as being usually about 20 inches in length, and its skull as measuring 2 inches 7 lines in length. He observed that this species may be distinguished from *G. Temminckii* by the proportionately larger ears and the greater length of the hands. The skull too he described as narrower in proportion to its length, the muzzle as broader and more obtuse, and the orbit as smaller. The temporal ridges, he remarked, generally meet near the occiput, or are separated by a very narrow space. The anterior incisor of the upper jaw is narrow, and has but one notch; the next incisor on each side is considerably larger, longer, and stronger than in *G. Temminckii*, and differs moreover in having its edges even—the same remark applies to the first false molar. In this species the incisors and molars form a continuous series, each tooth being in contact with that which precedes and that which is behind it. But Mr. Waterhouse concluded by observing that the most important difference perhaps which exists between the two species in question consists in the much larger size of the molar teeth in the smaller skull, the five posterior molars occupying a space of 10 lines in length, whereas in *G. Temminckii*, a much larger animal, the same teeth only occupy 9 lines. Several minor points of distinction existed besides those here mentioned. (*Zool. Proc.*, 1839; and see further *Zool. Trans.*, vol. ii., p. 335.)



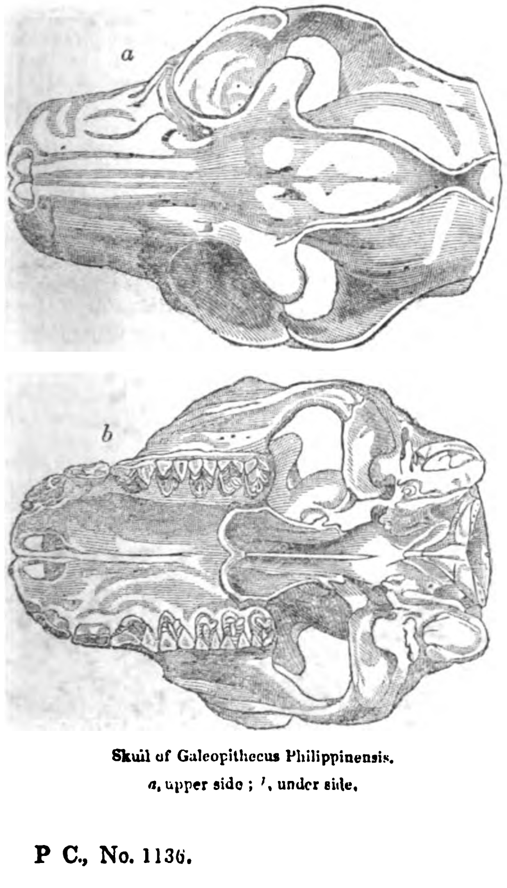
Skull of Galeopithecus Temminckii.
a, seen from above; *b*, seen from below. (Waterhouse, *Zool. Trans.*)



Lower jaw and teeth of Galeopithecus Temminckii.

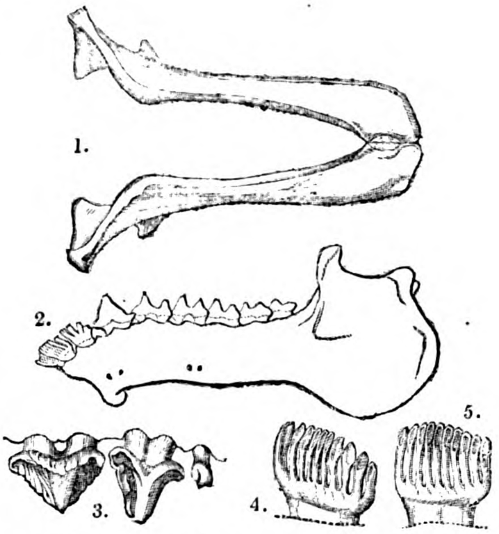
1, under side of the lower jaw: 2. side view of the same; 3, the three foremost teeth on either side of the upper jaw; 4, 5, outer and inner incisors of the lower jaw. (Waterhouse, *Zool. Trans.*)

N.B. Mr. Waterhouse remarks that the two first of the three foremost teeth of the upper jaw, commencing with the smallest tooth, are situated in the intermaxillary bone, and are therefore incisors. He adds that it is worthy of observation, that the posterior of these two teeth (on each side) *has a double fang.*



Skull of Galeopithecus Philippinensis.

a, upper side; b, under side.



Lower jaw and teeth of Galeopithecus Philippinensis.

1, under side of the lower jaw; 2, side view of the same; 3, the three foremost teeth, upper jaw; 4, 5, outer and inner incisors of lower jaw. (Waterhouse, *Zool. Trans.*)

Galeopithecus Temminckii.

PLEURORHYNCHUS, the generic name assigned by Professor Phillips to the singular fossil conchifers known, by Mr. Sowerby's excellent figures in the 'Mineral Concology of Great Britain,' as Cardium hibernicum, C. alæforme, &c. There are six species in the carboniferous limestone of the North of England. (*Geol. of Yorkshire*, vol. 2.) None are mentioned by Mr. Murchison in the Silurian rocks; but one or two occur in the old limestones of the Eifel, Westphalia, and South Devon.

The principal character of the genus is the lateral production of the valves from beneath their incurved beaks into a spinelike or conical umbo (πλευρα, 'side;' ῥυγχος, 'beak').

PLEURO'TOMA. [SIPHONOSTOMATA.]

PLEXAURA, a subdivision of the Linnæan genus Gorgonia. [ZOOPHYTARIA.]

PLEYEL, IGNACE, or IGNAZ, a composer in great repute towards the close of the last century, was born in 1757, at Rupperstahl near Vienna. It may not be unworthy of remark that he was the twenty-fourth child of Martin Pleyel, a schoolmaster, and of a lady of noble family, who incurred the resentment of her parents by her marriage, and was disinherited. In giving birth to the subject of this notice she died, and the widower having again entered into the matrimonial state, had fourteen children by his second wife, and lived to attain his ninety-ninth year. Ignace was, according to the Austrian custom, initiated in Latin and music at a very early age. When sufficiently advanced in the latter, he had Vanhall for a master, and subsequently Haydn; but the last was too great a genius to be a good teacher, and the student acquired more knowledge of his art during an extensive tour which he soon made in Italy, then the land of song, by hearing the best works of the celebrated composers, and more taste by listening to the distinguished performers of that country, than by all the lessons he had received in Vienna.

In 1783, Pleyel was appointed *Maître-de-Chapelle* of Strasburg cathedral, and there composed many masses and motets, the whole of which were destroyed in a great fire shortly after they were written. During the next ten years he produced nearly all those works which carried his name into every city in Europe. In 1791 he visited London, on the invitation of the managers of *The Professional Concert*, who engaged him as a kind of rival to Haydn (whose services had been secured by Salomon for his concerts), and composed for them three symphonies, for which and his personal assistance he received a large sum, which he invested in the purchase of an estate near Strasburg. [CONCERT; HAYDN.] In 1793, during the phrenzy of the French revolution, he became a suspected person, and, having been several times denounced, at length deemed it prudent to fly, but was pursued and taken. He then pleaded his acquiescence in the new order of things; nevertheless, as a proof of his sincerity, he was required to set a kind of drama for the anniversary of the 10th of August. This he accomplished under the surveillance of two gendarmes, and saved his life. Thoroughly alarmed however at violences which were even more indiscriminate and atrocious in some of the provinces than in the capital, he sold his property, went to Paris, and entered into a widely extended commercial speculation as publisher of music and manufacturer of piano-fortes. This proved successful, and after a long, active, laborious career, he retired to an estate near Paris purchased by the fruits of his talents and industry, and indulged his taste for agriculture. But the revolution of 1830 excited in him fresh though unnecessary alarm, and violently agitated a frame not naturally strong. His health failed, and, after much anxiety and suffering, he died, in November, 1831. He left one son, who inherited some portion of his father's genius, but soon abandoned music as an art, and, following his parent's steps, pursued it very prosperously as a trade.

Pleyel, in the height of his popularity, was over-valued, and afterwards, when the tide of fashion turned against him, was under-rated. Through nearly all his compositions a stream of agreeable melody flows; they are marked by a style peculiarly his own, generally light, sometimes very trivial, but occasionally bold and vigorous. A few of his quartets possess much beauty, and when the prejudices against him are subdued by time, these, as well as his admirable Concertante, will be revived. The same act of justice will perhaps, at no distant period, be done to his Sonatas dedicated to the queen of England, as well as to those with Scottish airs, the comparative simplicity of which has for the present caused them to be thrown aside. Had posthumous fame been more his aim than immediate profit, Pleyel had that within him which might have secured the attainment of a considerable share of lasting celebrity.

PLICA POLO'NICA is the name given to a disease which is chiefly remarkable for the sticking together and matting of the hair, and which is peculiarly frequent in Poland: a few examples of it have been met with in Tartary, among the lower orders of the Russians, and in Hungary, and fewer still in Switzerland and France.

The disease chiefly affects the scalp; the hair grows to an unusual length, is matted together by a sticky and most offensively-smelling secretion, and is commonly infested with vermin. Indeed, the symptoms of the disease, as far as the hair is concerned, are only those which would result from excessive neglect of cleanliness; and hence many who have seen numerous cases in Poland, believe that they are only produced by the dirty habits of those affected, who, it is well known, if the disease do not spontaneously make its appearance, spare no pains to produce it. So great is the prejudice in favour of Plica entertained by the lower order of Poles, who regard it as affording a certain security from all other sickness and misfortunes, that they will through their whole lives endure the inconvenience and misery of carrying about huge masses of filthy stinking hair many feet in length, rather than submit to the removal of it, which is necessary for their relief.

There is sufficient evidence however that in many cases the Plica is not merely the result of uncleanliness; a kind which has been called false plica is undoubtedly often so produced; but in many instances the secretion of the viscid material from the scalp is preceded by the general symptoms of slight fever, headache, and increased sensibility of the skin. The scalp is extremely tender, and bleeds on the slightest injury, and the least pulling of the hair excites exquisite pain. When the secretion commences, these symptoms commonly subside. The only treatment which is known to be constantly beneficial is the removal of the hair, and strict cleanliness; other means must be decided in each case by the general state of the patient's health. The popular notion entertained in Poland, that dangerous diseases will follow the cutting of the hair, is entirely without foundation.

PLICA'TULA. [SPONDYLIDÆ.]

PLICIPENNES, according to Latreille, the third section into which the Neuropterous insects are divided. The insects belonging to this section are well known to anglers by the name of Caddis-fly, and in the larva state they are called caddis-worm or cadew-worm. They constitute the genus *Phrygania* of De Geer, and have been raised to the rank of an order by Messrs. Kirby and Spence and Dr. Leach, being the order *Trichoptera* of their systems.

The *Phryganiæ*, or Caddis-flies, are distinguished from other Neuropterous insects by the absence of mandibles, and in the structure of their mouth; in fact they evince an approach to the Lepidopterous insects as well as in some other characters; the wings are semitransparent, and when closed meet at an angle, like the roof of a house; they are usually hairy, hence the name Trichoptera; the posterior wings are longitudinally folded, and usually broader than the anterior pair; the head is small and furnished with two simple eyes, situated on the vertex, besides the ordinary compound eyes; the antennæ are very long and thread-like, and composed of very numerous indistinct joints; the palpi are four in number, the maxillary have often five joints in the females, and the labial palpi are three-jointed.

The larva, or Caddis-worm, always lives in the water, and encloses itself in a cylindrical case, open at both ends, and formed of pieces of stick, small shells, and various other substances, which the insect joins together by a silken web.

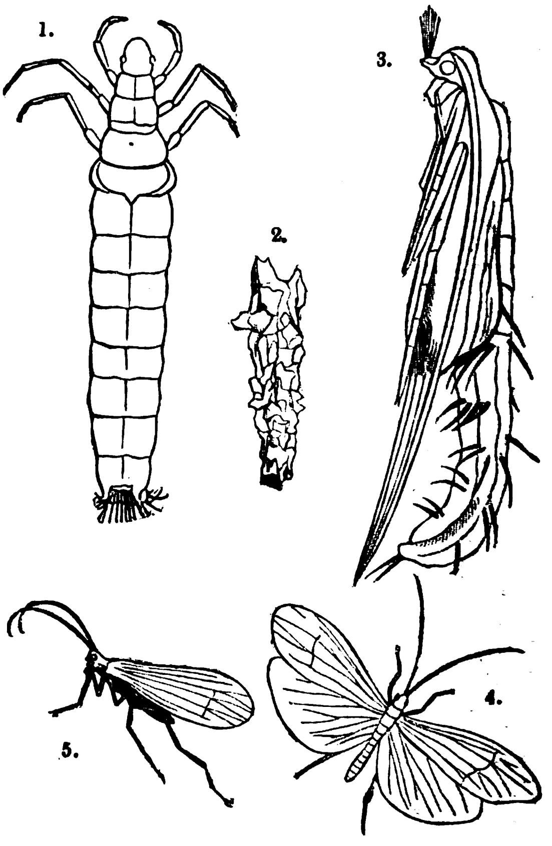


Fig. 1, Larva of a species of Phrygania, magnified; 2, case inhabited by the larva; 3, the pupa, magnified; 4, the perfect insect with the wings expanded; 5, ditto, with the wings in the ordinary position when the insect is at rest.

It never quits this case, but when it wishes to move it protrudes the fore part of the body, which is furnished with six tolerably long legs, and crawls about with the case attached to the hinder part, it being held by means of two hooks situated on the last segment of the abdomen. The form of the larva is nearly cylindrical, but slightly compressed; the head and first three segments of the body (which in fact constitute the thorax) are coriaceous, the remaining segments are soft. When about to change into the pupa state, the larva fixes its tube to some substance in the water, and closes the ends. The transformation is what is termed complete, the pupa resembling the perfect insect, except in having the wings imperfectly developed, and also in having two hooks on the fore part of the head, by means of which it makes its escape from the case, that it may swim to some dry situation when about to assume the perfect state.

The *Phryganiæ* are very numerous, and M. Pictet states that they abound more in the northern than in the southern parts of Europe. Their larvæ being always aquatic, they are generally found near the water; they fly chiefly in the evening, and are not unfrequently seen in immense numbers. The author just quoted, M. Pictet, has published a quarto volume,* with numerous plates, in which, after giving a detailed account of the anatomy and habits of these insects, he traces very many of them through all their stages. In this work, which is one of the most perfect monographs ever published, the *Phryganiæ* are divided into eight genera, as follows:—

Genus 1, *Phrygania* proper, distinguished by the superior wings, having some transverse nervures near the bifurcation of the principal nervures, the posterior wings folded; the antennæ setaceous, and equal in length to the wings; maxillary palpi but slightly pubescent, those in the males three-jointed, and those of the female having five joints; the terminal joint is ovate, and shorter than the two preceding taken together. Of this genus upwards of thirty species are known in Europe, some of which are the largest of the Phryganidæ.

Genus 2. *Mystacida*, Latreille. Anterior wings straight and elongated, having a few transverse nervures; posterior wings much folded; antennæ setaceous and slender, longer than the wings; maxillary palpi five-jointed in both sexes, long and pubescent.

Genus 3. *Trichostoma*, Pictet. Anterior wings short, without transverse nervures; posterior wings but slightly folded; antennæ comparatively thick and short, the basal joint very hairy; maxillary palpi three-jointed in the male, the terminal joint stout and more densely clothed with hair on the opical portion than at the base.

Genus 4. *Sericostoma*, Latreille. Anterior wings without transverse nervures; posterior small, and but slightly folded; antennæ stout and short, and having the basal joint long and thick; the maxillary palpi in the male shaped like the bowl of a spoon, and uniting to form a rounded muzzle.

The larvæ of the species of this genus inhabit a case which approaches to a conical form, and is more or less curved; it is composed of pieces of sand and small stones joined together. The perfect insect is slow in its movements.

Genus 5. *Rhyacophila*, Pictet. Anterior wings without transverse nervures; posterior wings straight, of the same form as the anterior pair, and almost destitute of folds; antennæ moderate, maxillary palpi five-jointed in both sexes, the second joint almost as short as the first, and the terminal joint ovate; abdomen often terminated by coriaceous appendages.

This genus contains many species, all of which are of small size.

Genus 6. *Hydropsyche*, Pictet. Anterior wings without transverse nervures; posterior wings folded, antennæ slender, maxillary palpi five-jointed in both sexes, the terminal joint almost equal in length to the other joints taken together, and very slender.

This is also a numerous group. The larvæ live almost always in running waters. The perfect insect is often spotted.

Genus 7. *Psychomyia*, Latreille. Anterior wings straight, pointed, and without transverse nervures; posterior wings resembling the anterior, and not folded; antennæ moderate, maxillary palpi five-jointed in both sexes, the terminal joint long and slender.

Genus 8. *Hydroptila*, Dalman. Anterior wings attenuated and pointed, very hairy, and with the nervures indistinct; posterior wings resembling the anterior, not folded, antennæ short and filiform, maxillary palpi five-jointed in both sexes, the terminal joint ovate.

PLI'NIUS VALERIA'NUS, a name mentioned in a Latin inscription found at Como (Gruter, i. 635), and given to the author of a work entitled 'Medicinæ Plinianæ Libri Quinque.' Nothing is known of his life, but the work is supposed to have been written about the fourth century A.D. It is a book on domestic medicine, compiled from Pliny the Elder, Dioscorides, Galen, and others, and is not of much value. The first three books are taken up with a list of diseases, beginning with the head, and descending to the feet, and contain an account of a great number of medicines, partly taken from the elder Pliny and partly from later writers. The fourth book treats of the properties of plants according to their names, and is in a great measure taken from Galen. The fifth book, which is almost entirely extracted from Alexander Trallianus, is upon diet as accommodated to different diseases. There is a little book by Just. Godofr. Günz, entitled 'De Auctore Operis de Re Medicâ, vulgo Plinio Valeriano ascripti,' Lips., 1736, 4to., in which, with much learning and ingenuity (but, in Haller's opinion, unsuccessfully), he tries to prove that the work in question was written by a Christian physician named Siburius, who is mentioned in the preface to Marcellus Empiricus. It was first published at Rome, 1509, fol., by Th. Pighinuccius: it was reprinted (and, according to Haller (*Biblioth. Med. Pract.*), much more accurately), Bonon., 1516, fol. It is also to be found in some of the collections of the old medical writers, namely, in that of Torinus (*Thorer*), Basil., 1528, fol.; and in the Aldine, Venet., 1547, fol.

PLINLIMMON. [CARDIGANSHIRE; MONMOUTHSHIRE.]

PLINTH. [COLUMN; CIVIL ARCHITECTURE.]

PLINY THE ELDER. CAIUS PLINIUS SECUNDUS was born, as is commonly supposed, A.D. 23. The place of his birth is very uncertain, and has been the subject of much learned controversy. The antient writer of his life, ascribed to Suetonius, and after him St. Jerome (*in Chron.*), call him a native of Como (*Novocomensis*); while in an old anonymous life he is said to have been born at Verona, and in the preface to his 'Natural History' he calls Catullus (who was certainly born there) his fellow-countryman (*conterraneum*). A full account of the arguments on both sides is given by Rezzonico, in his 'Disquisitiones Plinianæ,' who is himself inclined to give the honour to Como. Very little is known of the events of Pliny's public life; we are merely told that he was of a noble family, and after distinguishing himself in the field, and filling the office of augur at Rome, was appointed procurator of Spain. These employments however he did not suffer to hinder his studies; and his manner of life, as it is described by his nephew (Plin., *Epist.*, iii. 5), exhibits a degree of industry and perseverance scarcely to be paralleled. In summer he always began his studies as soon as it was light; in winter, generally at one in the morning, but never later than two, and often at midnight. No man ever spent less time in bed; and sometimes he would, without retiring from his books, indulge in a short sleep, and then pursue his studies. Before day-break, it was his custom to wait upon Vespasian, who likewise chose that season to transact business; and when he had finished the affairs which the emperor committed to his charge, he returned home again to his studies. After a slender repast at noon, he would frequently, in the summer, if he was disengaged from business, recline in the sun, during which time some author was read to him, from which he made extracts and observations. This was his constant method, whatever book he read; for it was a maxim of his, that 'no book was so bad but something might be learned from it.' When this was over, he generally went into the cold bath, after which he took a slight refreshment of food and rest; and then, as if it had been a new day, resumed his studies till supper-time, when a book was again read to him, upon which he would make some remarks as they went on. His nephew mentions a singular instance (*Epist.*, iii. 5) to show how parsimonious he was of his time, and how eager after knowledge. His reader having pronounced a word wrong, some one at the table made him repeat it; upon which, Pliny asked that person if he understood it, and when he acknowledged that he did, 'Why then,' said he, 'would you make him go back again? We have lost by this interruption above ten lines.' In summer he always rose from supper by day-light; and in winter, as soon as it was dark. Such was his way of life amidst the noise and hurry of the town; but in the country his whole time was devoted to study without intermission, excepting only when he slept, and when he bathed, that is, was actually in the bath; for during the operation of rubbing and wiping, he was employed either in hearing some book read to him or in dictating himself. In his journeys he lost no time from his studies, his mind at those seasons being disengaged from all other thoughts, and a secretary or amanuensis constantly attended him in his chariot; and that he might suffer the less interruption to his studies, instead of walking, he always used a carriage in Rome. By this extraordinary application, he found leisure to write a great number of volumes.

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* 'Recherches pour servir a l'Histoire et à l'Anatomie des Phryganides,' Geneva, 1834.

The circumstances of his death, like his manner of living, were very singular, and are also described at large by the elegant pen of his nephew. He was at that time, with a fleet under his command, at Misenum, in the Gulf of Naples, his sister and her son the younger Pliny being with him. On the 24th of August, A.D. 79, about one in the afternoon, his sister desired him to observe a cloud of a very unusual size and shape. He was in his study; but immediately arose, and went out upon an eminence to view it more distinctly. It was not at that distance discernible from what mountain this cloud issued, but it was found afterwards to ascend from Mount Vesuvius. Its figure resembled that of a pine-tree; for it shot up to a great height in the form of a trunk, which extended itself at top into a sort of branches; and it appeared sometimes bright, and sometimes dark and spotted, as it was either more or less impregnated with earth and cinders. This was a noble phenomenon for the philosophic Pliny, who immediately ordered a light vessel to be got ready; but as he was coming out of the house with his tablets for his observations, the mariners belonging to the galleys stationed at Retina earnestly intreated him to come to their assistance, since that port being situated at the foot of Mount Vesuvius, there was no way for them to escape but by sea. He therefore ordered the galleys to be put to sea, and went himself on board, with the intention of assisting not only Retina, but several other towns situated upon that beautiful coast. He steered directly to the point of danger, from which others were flying with the utmost terror, and with so much calmness and presence of mind, as to be able to make and dictate his observations upon the motion and figure of that dreadful scene. He went so near to the mountain, that the cinders, which grew thicker and hotter the nearer he approached, fell into the ships, together with pumice-stones and black pieces of burning rock: they were likewise in danger not only of being aground by the sudden retreat of the sea, but also from the vast fragments which rolled down from the mountain, and obstructed all the shore. Here he stopped to consider whether he should return, to which the pilot advising him, 'Fortune,' says he, 'befriends the brave; carry me to Pomponianus.' Pomponianus was then at Stabiæ, a town separated by a gulf which the sea, after several windings, forms upon that shore. He found him in the greatest consternation, but exhorted him to keep up his spirits; and the more to dissipate his fears, he ordered, with an air of unconcern, the baths to be got ready. After having bathed, he sat down to supper with apparent cheerfulness. In the meanwhile the eruption from Vesuvius flamed out in several places with much violence, which the darkness of the night contributed to render still more visible and dreadful. Pliny, to soothe the apprehensions of his friend, assured him it was only the burning of the villages which the country-people had abandoned to the flames: after this he retired, and had some sleep. The court which led to his apartment being in the meantime almost filled with stones and ashes, if he had continued there any longer it would have been impossible for him to have made his way out; it was therefore thought proper to awaken him. He got up, and went to Pomponianus and the rest of the company, who were not sufficiently unconcerned to think of going to bed. They consulted together whether it would be most prudent to trust to the houses, which now shook from side to side with frequent and violent rockings, or to fly to the open fields, where the calcined stones and cinders, though light indeed, yet fell in large showers and threatened destruction. In this distress they resolved for the fields, as the less dangerous situation of the two; and went out, having pillows tied upon their heads with napkins, which was all their defence against the storms of stones that fell around them. It was now day everywhere else; but there a deeper darkness prevailed than in the most obscure night, which however was in some degree dissipated by torches and other lights of various kinds. They thought proper to go down farther upon the shore, to observe if they might safely put out to sea; but they found the waves still running extremely high and boisterous. There Pliny, taking a draught or two of water, threw himself down upon a cloth that was spread for him; when immediately the flames, and a strong smell of sulphur which was the forerunner of them, dispersed the rest of the company, and obliged him to arise. He raised himself, with the assistance of two of his servants (for he was corpulent), and instantly fell down dead, suffocated, as his nephew conjectures, by some gross and noxious vapour; for he had always weak lungs, and was frequently subject to a difficulty of breathing. As soon as it was light again, which was not till the third day after, his body was found entire, and without any marks of violence upon it, exactly in the same posture that he fell, and looking more like a man asleep than dead.

Such is the interesting account given by the younger Pliny, in a letter to Tacitus (*Epist.*, vi. 16), of the death of this remarkable man. The titles of several of his works are given by his nephew (*Epist.*, iii. 5); of these the only one that is still extant is his 'Natural History,' which may well be called 'a work of great compass and erudition, and as varied as nature herself.' (*Ibid.*) To give anything like a complete critical analysis of this work would require the immense and multifarious learning of Pliny himself, and a thorough knowledge not only of all that the antients have written on the same subjects, but also of all the improvements and discoveries of modern times. Accordingly in the French translation, lately published, the assistance of a great number of scientific men has been secured, each of whom has laboured to illustrate Pliny's opinions on his own particular branch of knowledge. The work consists of thirty-seven books, all of which are still extant, though the text is in many places in a very corrupt state, and several passages are quite lost. The first book is a table of the contents of the other thirty-six; the second treats of the world, the elements, the stars, the winds, &c.; the third, fourth, fifth, and sixth contain a geographical account of the whole of the then known world; the seventh treats of the generation and organization of man, the most remarkable characters that have ever lived, and the most useful inventions; the eighth, ninth, tenth, and eleventh contain a system of zoology, and treat of beasts, fishes, birds, and insects, and of human and comparative anatomy; sixteen books, from the twelfth to the twenty-seventh, are given up to botany, and give an account of trees, herbs, fruit, corn, &c., and the medicines which they furnish; five books, from the twenty-eighth to the thirty-second, treat of medicines derived from different animals; the thirty-third and thirty-fourth, of different kinds of metals, &c.; the thirty-fifth, of colours and painting; the thirty-sixth, of stones and sculpture; and the thirty-seventh, of different kinds of gems, &c.

This will give some idea of the miscellaneous nature of the contents of this extraordinary work, and if the judgment of the writer had been equal to his industry and learning, it might well have been considered as one of the greatest monuments of human ability. However, the contrary is notoriously the case, so that (as Sir Thomas Brown quaintly observes, in his 'Vulgar Errors') 'there is scarce a popular error passant in our days which is not either directly expressed or diductively contained in this work.' It may however be more satisfactory to hear the opinions of two men, perhaps the most able of any naturalists of modern times to judge of his merits and his defects, Buffon and Cuvier. 'His work,' says the former, 'is on a much larger scale than that of Aristotle, perhaps indeed *too* vast. He wished to embrace everything, and seems to have measured nature, and found her too small for his genius. His "Natural History" comprehends (besides the history of animals, plants, and minerals) that of the heavens and the earth, medicine, commerce, navigation, the history of the liberal and mechanical arts, the origin of customs, and in short, all the natural sciences, and all human arts; and what is most astonishing is, that in each department he is equally great. The loftiness of his ideas and the nobleness of his style enhance still more his profound learning. He not only knew all that in his age could be known, but he had that facility of thinking on a grand scale which multiplies science; he had that nicety of reflection on which depends elegance and taste; and he communicates to his readers a certain freedom of spirit and boldness of thought, which is the germ of philosophy. His work, no less varied than nature herself, always paints her in the brightest colours. It may be called a mere compilation of all that had been written before him, a copy of all that was excellent and useful to be known; but still this copy has such grand features, this compilation contains things put together in so novel a manner, that it is preferable to the greater part of original works which treat on the same subjects.' (Buffon, *Discours Premier sur l'Hist. Nat.*)

The character given by Cuvier (*Biogr. Univers.*, tome xxxv.) is not so favourable, but is more correct. 'Pliny's great work,' says he, 'is at the same time one of the most precious monuments left us by antiquity, and a proof of the astonishing learning of a warrior and a statesman. In order justly to appreciate this vast and celebrated composition, it is necessary to consider the plan, the facts, and the style. The plan is immense,' &c. &c. 'It was impossible but that the author, in treating of this prodigious number of objects, however rapidly, should record a multitude of remarkable facts, which are to us the more valuable, as he is the only extant author who mentions them. Unhappily the way in which he has collected and arranged them causes them to lose much of their value by the mixture of truth and falsehood which is met with in almost equal proportions, and especially by the difficulty (and in most cases the impossibility) of recognising the precise creatures that he means to describe. Pliny was not an observer, like Aristotle; still less was he a man of genius, capable, like that great philosopher, of seizing the laws and relations which have guided nature in her productions. In general he is only a compiler, and indeed for the most part a compiler who has not himself any idea of the subjects on which he collects the testimonies of others, and therefore cannot appreciate the truth of these testimonies, nor even always understand what they mean. In short he is an author devoid of criticism, who, after having spent a great deal of time in making extracts, has ranged them under certain chapters, to which he has added reflections that have no reference to science properly so called, but display alternately either the most superstitious credulity, or the declamations of a discontented philosophy, which finds fault continually with mankind, with nature, and with the gods themselves.'—'A comparison of his extracts with such of the original authors as are still extant, and especially with Aristotle, shows us that Pliny was far from selecting either what was most important or most exact. In general he prefers whatever is singular and marvellous, whatever helps him in establishing the contrasts he so much delights in, or the reproaches he is so fond of uttering against Providence. It is true that he does not give the same degree of faith to everything that he mentions, but it is quite by chance that he believes or doubts; and it is by no means the most childish stories that always provoke his incredulity.'—'Another great fault in Pliny is that he does not always give the true sense of the authors that he translates, especially in the designation of different species of animals; and though we have so few materials remaining to enable us to judge of this kind of error with any degree of certainty, it is easy to prove that in several instances he has mistranslated the names of the animals mentioned by Aristotle.'—'It must then be confessed that, as far as his facts are concerned, the only part of his work which has any real interest for us in the present day is that which relates to the manners and customs of the antients, and to their proficiency in different arts, besides some historical and geographical details, which are to be found nowhere else.'—'With respect to his style, wherever he introduces general ideas or philosophical views, his language assumes an energy and vivacity, and his thoughts acquire an unexpected boldness, which makes some amends for his dry enumerations, and excuses him, in the opinion of many of his readers, for the deficiencies of his scientific information. He is perhaps too fond of point, and contrast, and emphasis; and there is in some places an obscurity, which results less from the nature of his subject than from a desire of expressing himself with a pregnant brevity and conciseness; but he is always grave and noble, and everywhere shows a love of justice and respect for virtue, a horror of the cruelty and meanness of which he had before his eyes such terrible examples, and a contempt for the unbridled luxury which had in his time so deeply corrupted the Roman people. In these respects he cannot be too much commended; and in spite of the defects which we cannot but recognise in him when we consider him as a naturalist, we must nevertheless allow that of all the authors who wrote after the Augustan age, he deserves to be regarded as one of the most valuable and most worthy to be ranked among the classics. It must however be confessed,' adds Cuvier, 'that he was almost an atheist, or at least that he acknowledged no other god than the World; and few philosophers have set forth the system of pantheism with more copiousness and energy than he has done in the second book of his "Natural History."'

Not the least important part of Pliny's work is his compendious history of the arts amongst the Greeks, in books xxxiv., xxxv., and xxxvi.; for though so often minute and circumstantial in his details of unimportant matters, and often negligent and careless about subjects of the highest interest, Pliny's account is upon the whole clear and succinct, and evidently contains many extracts from the writings of antient artists themselves.

The errors that we have to reproach him with are either unimportant inaccuracies inseparably connected with so great an undertaking as his 'Natural History,' or some few misconceptions owing to his want of a practical acquaintance with the arts, and which may be easily remedied by an artist. At the same time it cannot be denied that he is frequently credulous and his matter irrelevant, and his accounts are occasionally such a confusion of tradition and legend, that it is almost impossible to distinguish what is authentic from what is fabulous; such is his account of the origin of the imitative arts (xxxv. 12, 43). It is also evident that he frequently did not clearly understand what he has endeavoured to convey to others, and the consequence is, that he is sometimes unintelligible; yet this may be partly owing to the corrupt state of his text. He also lavishes encomiums upon the most trivial objects and examples of purely mechanical excellence, and passes cursorily over the greatest works, as the paintings of Polygnotus at Delphi (xxxv. 9, 35) and the Jupiter of Phidias at Olympia (xxxiv. 8, 19; xxxvi. 5, 4). Of the Laocoon however he says (xxxvi. 5, 4), that as a work of art it was superior to any production either of painter or sculptor; and with him the art of Apelles is synonymous with unrivalled excellence.

He commences his historical sketch, but more particularly that of painting, from the time of Polygnotus and Phidias; everything that took place before that time he very summarily terms the *incunabula*, or first efforts of art. His immediate authorities probably gave him no satisfactory account of an earlier period. Concerning this period however he has given us many valuable though unconnected remarks. Yet, when we consider the original sources that he appears to have consulted—the writings of antient painters and sculptors, the works of Apelles, Euphranor, Antigonus, Xenocrates, Pasiteles, and Menaechmus, all of which are mentioned by Pliny himself (and there were many others that he might have consulted) (Junius, *De Pic. Vet.*, ii. 3), the volumes of Melanthius, Pamphilus, Protogenes, and others—we cannot help feeling surprise that he has given us so little, and we are induced to conclude, with Fuseli, 'that he was more desirous of knowing much than of knowing well.' However, out of about one hundred artists of great celebrity, of whom more than the third were painters, the rest sculptors, statuaries, and workers of gems, &c., and more than twice that number of artists of less note, whose names have been handed down to us, Pliny has scarcely omitted one name of importance, but has on the other hand preserved notices of the works of many artists of whom we have no mention whatever in any other antient writer. In his dates he seldom errs.

The following is the opinion of Flaxman upon this part of Pliny's 'History,' perhaps in such matters the greatest critic of modern times. He says the whole is 'arranged with attention to the several improvements in chronological order, with such perspicuity and comprehension, that whenever, from the brevity of the work, we do not find all we wish for—yet, by attending to the information prior and subsequent, we shall easily be enabled to supply the defect from other writings or monuments of antiquity.'

The 'Geography' of Pliny is an important part of his 'Natural History,' but the same general remarks will apply to it that apply to the whole compilation; it is the work of a man who had abundant materials before him, but either knew not how to use them or did not take pains enough. This geographical sketch, which comprehended the then known world, is much too brief to be perspicuous; so much is crowded into a narrow compass, that it is often almost a bare catalogue of names, and if we had no other guides, it would continually mislead us. Pliny's description of what he calls Græcia, which commences with Attica, is a good example of his careless and confused compilation; and yet he has, even in his 'Geography,' preserved many curious facts, and he must have often had access to excellent materials. As examples of this we may mention his remarks on the Niger [NIGER]; his observation (vi. 17) that the word 'Imaus' (Himalaya) in the native language signifies 'snowy,' which is quite correct; his remarks on Taprobane (Ceylon), and generally his remarks on India; his account of the Atlas, founded on the authority of Suetonius Paulinus; and other things of the like kind, which render this part of his compilation valuable for incidental facts, thought it is of no value as a systematic work.

The number of editions that have been published of his work is immense, and more than twenty appeared before the end of the fifteenth century. However, only the most curious and the most valuable can here be noticed. The first edition was published at Venice, 1469, fol., by Joannes de Spira. There is an ample account of it in Schweiger's 'Handbuch der Class. Bibliogr.,' and in Dibdin's 'Greek and Latin Classics,' who says that 'the elegance of the Roman type, the regularity of the press-work, the strength and tint of the paper, the breadth of the margin, and the quantity of text which each page exhibits, afford altogether a perfect picture of antient typography.' With respect to its critical worth the Bipont editors thus observe, from Rezzonico:—'Vitiose expressa multa, sed tamen multa meliora quàm in aliis editionibus; unde ad textum Plinii constituendum necessaria est.' The second edition, which is also described by Schweiger and Dibdin, and is a volume of great rarity, was printed by Sweynheym and Pannartz, Romæ, 1470, fol. Those most worth mentioning for their critical excellence are, that by Hardouin, Paris, 1685, 4to., 5 vols., of which a second edition was published, Paris, 1723, fol., 3 vols., and 'is by far the more copious, splendid, and critical performance;' that by Franzius, 8vo., 10 vols., Lips., 1778-1791; and that published by Panckoucke, Paris, 8vo., 20 vols., 1829-33, with a new French translation by Ajasson de Grandsagne, and copious notes by many of the most eminent scientific men of France. The edition by Sillig, Lips., 1831-36, 12mo., 5 vols., is particularly worth noticing on account of its containing the Various Readings of a MS. at Bamberg, which had never before been collated, and which not only inserts words and clauses in several passages that had never been suspected of being unsound (thus proving beyond a doubt that much of the obscurity of Pliny's style may be attributed to the corrupt state of the text), but also adds several sentences at the end of the whole work, and concludes with the following epilogue: 'Salve parens rerum omnium, Natura, teque nobis Quiritium solis celebratam esse numeris omnibus tuis, fave.' Perhaps the two most useful works in illustration of Pliny are the 'Exercitationes Plinianæ' of Salmasius, 2 vols. fol., Paris, 1629; and the 'Disquisitiones Plinianæ' of Latour-Rezzonico, 2 vols. fol., Parmæ, 1763-1767. It has been translated into almost all languages; into Arabic by the famous Honain Ibn Ishak (better known perhaps by his Latinized name *Joannitius*); into Italian by Landino, Venet., fol., 1476, of which magnificent volume there is an account in Schweiger and Dibdin; by Bruccioli, Venet., 4to., 1548; and by Domenichi, Venet., 4to., 1561; into German by Denso, 1764-1765, Rostock, 4to., 2 vols., and by Grosse, 1781-1788, 8vo., Frankf., 12 vols.; into English by Holland, 1601, Lond., 2 vols. fol.; into Spanish by Huerta, Madrid, 2 vols. fol., 1624-29; into old French by Dupinet, Lyon, 1562, 2 vols. fol.; and into modern French by Poinsinet de Sivry, with astronomical notes by Bouguer and Lalande, and mineralogical by Guettard, 4to., 12 vols., Paris, 1771-1782. The best French translation is that in the edition by Panckoucke mentioned above. A Dutch translation was published at Arnheim, 4to., 1617.

PLINY THE YOUNGER. CAIUS PLINIUS CÆCILIUS SECUNDUS was born at Comum, a town on the lake Larius in Insubria. The date of his birth is A.D. 61 or 62; for he himself tells us (*Ep.*, vi. 20) that he was in his eighteenth year when the extraordinary eruption of Mount Vesuvius took place which occasioned the death of his uncle; and this event was in A.D. 79.

Of his father nothing is known, except that his name was Caius Cæcilius, that he was of equestrian family, and that he died in the early days of his son. His mother was Plinia, the sister of Pliny the Elder, at whose house, after losing her husband, she, with her son, took up her abode The young Cæcilius was adopted by Pliny (*Ep.*, v. 8), and was thenceforward called by his name.

His education commenced under the care of his mother and uncle. Verginius Rufus, of whom his pupil has left a grateful record (*Ep.*, ii. 1), was left his tutor. His youthful attainments were of no ordinary kind, for he composed a Greek tragedy in his fourteenth year. After this he went to Rome and studied rhetoric under Quintilian and Nicetes. At the age of nineteen he began to practise in the court of the Centumviri, and he subsequently appeared as an advocate in several cases before the Senate: but though he may have had a competent knowledge of law, it is clear from his own letters that he had no great capacity for difficult legal questions. The following references will show in what kind of cases he was chiefly employed:—v. 8; ii. 14; iv. 16; ii. 11, 12; iii. 4, 8; iv. 9, 16, 24; v. 20; vi. 5, 13, &c.

In his twenty-first year he went as military tribune into Syria, where he met with Euphrates the stoic and Artemidorus, whose society he made available to his improvement in the study of philosophy. He seems, within the space of two years, to have returned from Syria; and we find him resident at Rome until, about the forty-second year of his age, A.D. 103, he was appointed by Trajan proconsul of Bithynia, after he had, with the greatest honour to himself, discharged numerous other offices in the state, and had attained the rank of senator, as is inferred from his letters. (iii. 20; iv. 25.)

He cultivated a friendship with many eminent men, particularly with Tacitus the historian, his senior by a few years, whom he strove earnestly to imitate. Tacitus, on the other hand, held him in no less admiration, and entrusted him with the correction of his own works. Indeed the friendship of Pliny and Tacitus became in a manner proverbial; and they were esteemed the most learned men of their time, 'the duumviri of letters,' as Cellarius calls them.

Pliny was a man of strict frugality and temperance; he was affable and kind to all men; and being possessed of an ample fortune, he was exceeded by none in acts of beneficence, whether public or private. He was twice married, though his second wife only (Calpurnia) is mentioned by name, and she was a very accomplished woman. He had no children.

The time and other circumstances of Pliny's death are uncertain. It is however generally believed that he died about the end of Trajan's reign, which was A.D. 116.

Of many works written by Pliny, we have only his 'Epistles,' in ten books, and his 'Panegyric upon Trajan.' The latter has been always admired as a composition of great excellence. The first nine books of the 'Epistles' are addressed to various persons; the tenth book consists of epistles addressed to Trajan only, with a number of Trajan's answers. These epistles, which abound in useful and entertaining matter, are thus characterised by Erasmus:—'The epistolary style ought to be simple, and, as it were, rather careless; for there is a sort of careful carelessness. As an example, take the letters of Pliny; they are witty, elegant, and appropriate; in them you read nothing but what pertains to domestic every-day life, and everything simply Latin, chaste, and well set off: and, though this style is wrought up and elaborated with much art and ingeniousness, and culture, yet it seems in a manner unlaboured, sudden, and extemporaneous.'

The name of Pliny the Younger has, from the days of Tertullian, been mentioned with peculiar interest by Christian writers on account of the testimony which he bore concerning the Christians of his day in Bithynia. They form the subject of a rather long letter (x. 97) to Trajan, written about forty years after the death of St. Paul, and followed by a short answer from Trajan. With all his advantages of education, Pliny was superstitious and credulous. Though a kind-hearted man even to slaves (viii. 1, 16, 19), he was intolerant and cruel to the Christians; and, according to his own account, he put to death the Christians of Bithynia who would not abjure their religion, though he considered it only an innocent superstition.

The materials for Pliny's life may be collected from his Epistles, from which a brief notice has been drawn up by Cellarius, and one more elaborate by Masson; there is also a very complete Life of Pliny, with abundant references to his letters, prefixed to E. Thierfeld's German translation of the 'Epistles and Panegyric,' Munich, 1828. But the reader is referred to the Epistles themselves for the most gratifying notice of Pliny the Younger, every epistle being, as Melmoth observes, 'a kind of historical sketch, wherein we have a view of him in some striking attitude either of active or contemplative life.'

Pliny's Epistles have been translated into English by Lord Orrery and Mr. Melmoth.

The best edition of Pliny's 'Epistles' is that of Cortius and Longolius, 4to., Amst., 1734. Of the editions of the 'Epistles and Panegyric' together, may be recommended those of Christopher Cellarius, 12mo., Leipzig, 1693; Hearne, with Life, by Masson, prefixed, 8vo., Oxford, 1703; Gierig, 2 vols. 8vo., Leipzig, 1806.

PLOCAMO'CEROS (Leuckard), a mollusk placed by Cuvier in his family *Nudibranchiata.*

PLO'CEUS. [FRINGILLIDÆ; WEAVER BIRDS.]

PLOCK. [POLAND.]

PLOCK, the capital of the government of the same name, is situated on the Vistula. It has about 8000 inhabitants, of whom 3000 are Jews. Plock is the see of a Roman Catholic bishop, who resides at Pultusk. There are in the town 11 churches, 5 convents, an episcopal palace, a Piarist gymnasium, a seminary of secular priests, and various useful institutions, and an orphan-house, a lunatic asylum, a literary society, &c. The inhabitants subsist partly by agriculture and partly by a brisk trade with Danzig and other places.

PLOERMEL. [MORBIHAN.]

PLOMBGOMME—*Hydrated Aluminate of Lead.* This mineral is in small globular and reniform masses, composed of many thin concentric layers. Fracture conchoidal, uneven. Hardness sufficient to scratch fluor-spar, but not glass. Colour yellow, sometimes tinged with brown, and possessing the appearance of gum-arabic. Translucent. Specific gravity 6·425.

When heated by the blowpipe, it loses water, but is infusible per se. With borax it gives a transparent glass.

It is found in the French department of Côtes du Nord.

Analysis by Berzelius:—

Alumina . . .	37·0
Oxide of lead . .	40·14
Water . . .	18·80
Sulphuric acid . .	0·20
Lime and oxides of manganese and iron . .	1·80
Silica . . .	·60
	98·54

PLOT, ROBERT, LL.D. (born 1641, died 1696), a name connected with literature and science in various departments, was the son of Robert Plot, of Sutton-Barne in Kent, and born in that county. He had his early education in the school at Wye, from which he passed to Magdalene Hall, Oxford. He took his Master's degree in arts and both his degrees in law, and then removed to University College. In 1677 he published a 'Natural History of Oxfordshire,' intending to publish similar works on other counties, a work which gained for him considerable reputation. In 1682 he was elected one of the secretaries of the Royal Society, and in the succeeding year was appointed by Ashmole the keeper of the museum which he had founded at Oxford. About this time also he was chosen professor of chemistry in that university. In 1685 he published a tract on the origin of springs, and in 1686 a 'Natural History of Staffordshire,' on the plan of his work on Oxfordshire.

So far his life is that of a naturalist and man of science; but having attracted the attention of the duke of Norfolk by an encomiastic speech which he pronounced when the duke was admitted to the degree of D.C.L. in the University, he was appointed his secretary, and in 1688 was made by King James II. historiographer royal, a privilege being granted to him of access, without the payment of fees, to all the depositaries of the public records. In 1694 he was introduced into the College of Arms by the title of Mowbray Herald Extraordinary, when he was also made registrar of the Court of Honour. What he might have done in the department of history and antiquities, we cannot determine, as he lived not long after he thus deviated from his original path, dying at his hereditary estate at Sutton-Barne, at the age of fifty-five. He can hardly be said to have established a permanent reputation.

PLOTI'NA. [TRAJANUS.]

PLOTI'NUS, the most celebrated writer and teacher of the Neo-Platonic school at Alexandria, was born at Lycopolis in Egypt, A.D. 204. At the age of twenty-eight he betook himself to the study of philosophy, and attended the lectures of most of the teachers who then flourished at Alexandria. He attached himself more particularly to Ammonius, the founder of the Eclectic school, and studied for eleven years under that master. The expedition which the emperor Gordian undertook against the Parthians in A.D. 243 furnished an opportunity, which Plotinus had long coveted, of forming a personal acquaintance with the sages of the East, whose doctrines were so much commended by the philosophers of the Alexandrian school, and were supposed by them to have formed the basis of many of the speculations of their great master Plato. Accordingly, Plotinus joined the army of Gordian, which he accompanied as far as the Euphrates, and when the emperor was murdered there, he fled first to Antioch and then to Rome. During the first ten years of his residence at Rome, Plotinus contented himself with giving oral instruction to his pupils, but at last, in his fiftieth year, he was induced by the importunities of Porphyry, the most famous of his disciples, to commit to writing the substance of his lectures. He remained at Rome till his death in A.D. 274, and during all that time he was busily engaged as a teacher of the Eclectic or Neo-Platonic doctrines. He was a great favourite with the emperor Gallienus, who was on the point of allowing him to rebuild a ruined city in Campania, in order that he might try the experiment of establishing an Utopia there after the model of Plato's republic. He died in Campania, not on the scene of his projected city of philosophers, but at the house of a friend, who maintained and attended him during his sufferings under an accumulation of diseases.

The works of Plotinus consist of fifty-four books, which were divided into six *Enneads*, or sets of nine books, by his pupil Porphyry, who endeavoured to reduce them to intelligible order, and to correct the obscurities and other faults of style under which they laboured. He is perhaps one of the most mystical and confused authors in any language, and we shall not wonder at this if we recollect some of the facts which Porphyry has told us about his method of composing. We have already mentioned that he did not begin to write till he was fifty years old, and then he seems to have set down his thoughts quite at random and as they occurred to him. His hand-writing was very bad, and his spelling very indifferent; his eye-sight was so weak that he could hardly read his own writing, and he could never be brought to revise his works. When we add to this that his subjects were the most abstract that could be devised—'On entity and unity;' 'On the essence of the soul;' 'On the unity of the good;' 'Whether there be many souls or only one soul?' and so forth—it will perhaps be considered that he is not a very inviting author. Nevertheless, he has found many admirers, and has, either directly or through his follower Proclus, exercised a most important influence on the opinions of more recent philosophers, especially among ourselves. Cudworth, Henry More, Norris, Gale, and others were students rather of Plotinus and Proclus than of Plato himself; and the gnosticism of some sects of Christians, with the pantheism of Spinoza and others, may be fairly traced to this obscure writer and his school. We know nothing further of Plotinus than what is contained in his Life by his pupil Porphyry.

A superb edition of the works of Plotinus, in 3 vols. 4to., has been recently published at the Oxford University Press, with this title: 'Plotini Opera Omnia. Edidit Fridericus Creuzer. Oxon. E Typographeo Academico, 1835.' There is an English translation of 'Select Works of Plotinus,' by Taylor.

PLOTTING. [SURVEYING.]

PLOTUS. [PELECANIDÆ.]

PLOUGH. That the plough is an instrument of the highest antiquity is apparent both from the oldest writings that we possess and from the existing monuments of Egypt We might exercise our imagination in supposing a probable origin of the plough in the branch of a tree dragged along the ground, in which the stump of a smaller branch made furrows as it went on. It seems indeed probable that some accidental circumstance first suggested this mode of stirring the earth to prepare it for receiving the seed.

The oldest forms of the plough of which we have any description in antient authors, or which are represented on monuments and coins, are very simple: a mere wedge, with a crooked handle to guide it, and a short beam by which it was drawn, form the whole instrument. The light Hindu plough, now in use in many parts of India, seems to differ little from the old model.

Before we enter into any details it may be as well that we describe the different essential parts of a plough, by the names which are usually given to them.

The body of the plough is that part to which all the other parts are attached. The bottom of it is called the *sole*, or *slade*, to the fore part of which is affixed the *point*, or *share*; the hind part of the sole is called the *heel*. The *beam*, which advances forward from the body, serves to keep the plough in its proper direction, and to the end of it are attached the oxen or horses which are employed to draw it. Fixed in the beam, in a vertical position, before the point of the share, with its point a little forward, is the *coulter*, which serves to cut a vertical section in the ground, while the point of the share, expanding into a *fin*, separates a slice by a horizontal cut from the subsoil or solid ground under it. The *mould-board*, or *turn-furrow*, is placed obliquely behind the fin, to the right or left, in order to push aside and turn over the slice of earth which the coulter and share have cut off: it thus leaves a regular furrow wherever the plough has passed, which furrow is intended to be filled up by the slice cut off from the land by the side of it, when the plough returns. The stilts or handles, of which there may be either one or two, as is thought more convenient, direct the plough by keeping it in the line required and at a regular depth in the ground. The single stilt appears to be the most antient form.

Wheels are a modern invention in comparison with the other parts. They support the end of the beam, and prevent it from going too deep into the ground or rising out of it while the plough is going on. The greatest improvements introduced into modern ploughs are in the shape of the mould-board, or turn-furrow, of which we shall take particular notice, and the contrivances for regulating the line of draught, so as to make the plough go at an equal depth, and cut off a regular slice of equal breadth, without any great force being applied by the ploughman who holds the stilts.

The Hindu plough consists of a slight beam, often without any coulter, a narrow share, and a corresponding stilt. The whole is of wood, slightly pointed with iron. It is so light that a man can readily carry it upon his shoulder. When it is at work it is usually drawn by a small buffalo, and sometimes by a man or a woman. This instrument is intended merely to make a shallow furrow in a very light soil, or in the mud produced by irrigation where rice is cultivated. It does not act as our ploughs do, nor does it turn over a regular furrow, but it acts more like one of the tines, or teeth, of some of our more complicated instruments called cultivators or grubbers, with which the earth is stirred without being turned over.

The Chinese plough resembles the Hindu in its simplicity. The earth is turned over by holding the instrument obliquely, and much depends on the art of the ploughman, in whose hands it is like a stout shovel pulled through the ground by a horse or ox. The sole is not straight, but rounded, like the bottom of a boat. The work done by this instrument is not unlike the furrow drawn in the sand at the bottom of the sea when a ship drags her anchor.

The ploughs in use in different countries in Europe have undergone little change for many centuries; it is only lately that any attempt has been made to vary the old forms.

The Roman plough, such as is described by Virgil in the 'Georgics' (i. 174), is still used in many parts of France, under the name of *Araire Romain*. It consists of a beam (*temo*), a body (*buris*), a share (*vomer*), and a handle or stilt (*stiva*). The office of the turn-furrow is performed by two pieces of wood about six inches long projecting obliquely upwards, and very properly called teeth (*dentalia*), E F (*Fig.* 1) The sole of the plough AB has two pieces of wood CG and DH fixed to it on each side, forming an acute angle with it, in which the teeth are inserted. This exactly answers the description of Virgil, 'Duplici aptantur dentalia dorso' (the teeth are fitted to the double back). These teeth help to push aside the earth to the right and left, and the instrument resembles what is called a moulding plough, which is used in throwing the soil aside against young plants growing in rows, as turnips, potatoes, &c. A chain or pole connected with the end of the beam was hooked to the middle of the yoke on the neck of the oxen, and thus the plough went on making parallel furrows, so near to each other that the preceding furrow was partially filled with the earth which the dentalia pushed aside. The point was in the shape of the head of a lance. This plough might suffice in light mellow soils, which had been long in cultivation and had more the texture of garden mould than of stubborn clay.

Fig. 1.

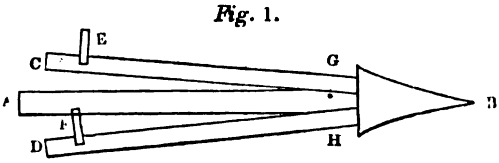
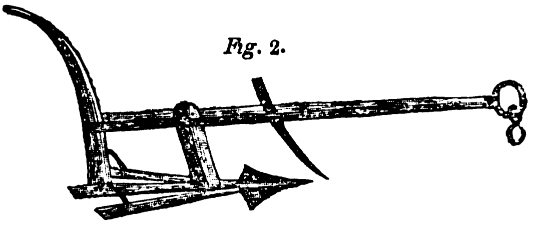


Fig. 2.



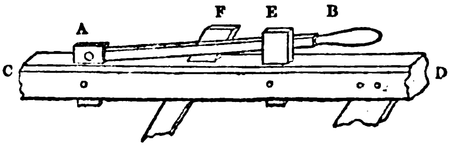
Roman Plough.

The small double mould-board plough, common in other parts of France, is evidently taken from this. The teeth not being sufficiently strong, a slanting board was substituted on each side, and wheels were added, to diminish the labour of the ploughman. The stilt remained the same at the place where it is attached to the plough, but higher up it was divided into two, like a fork, for the convenience of holding it with both hands. This plough acts exactly like the other, but it is stronger and better adapted for heavier land. Neither of them goes much deeper than four or five inches, leaving shallow parallel ridges, in which the seed falls, and is buried by light wooden harrows, which are drawn over the land after sowing. This is an imperfect tillage, the bottoms of the furrows being only partially stirred. The broad flat share, and the single mould-board which turns the earth completely over, after lifting it up, is a far more effectual instrument, and has been adopted wherever agriculture has made any improvement. This plough more nearly imitates the digging with a spade; and the more perfect the imitations, the better is the work.

The mould-board of a modern plough is either fixed on one side, or made so as to be shifted from one side to the other. In the first case half the furrow-slices lie on one side and half on the other, and there is of necessity a double furrow where they join. When it is desirable that the surface should be quite flat, and the furrow-slices all in one direction, the mould-board must be shifted at every turn, and a plough which admits of this is called a turn-wrest plough.

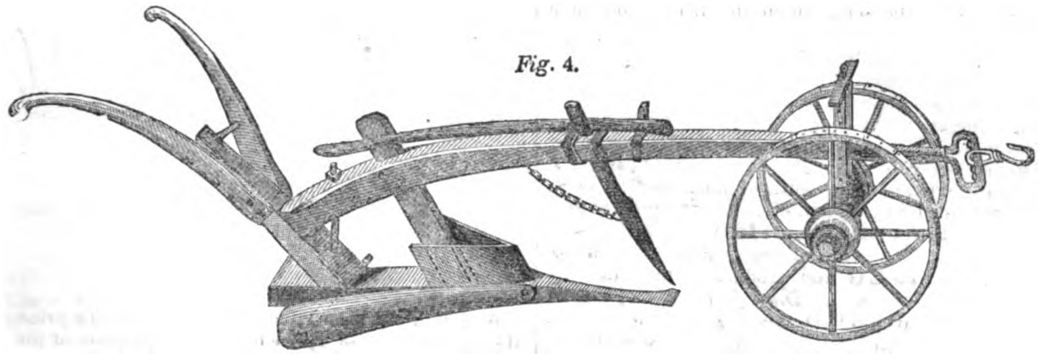
It is evident that the mould-board of a turn-wrest plough must be so constructed as to act with either side uppermost; it can therefore have only a very slight convexity to push over the slice cut off by the coulter and share; and a considerable force is lost by the obliquity of the action in doing so. The share of this plough is pointed like a lance, or presents a flat edge like a broad chisel, according as the soil is light or heavy. The point of the coulter is placed on line with that side of the point which is nearest to the unploughed land, and this is done by means of a piece of wood AB (*Fig.* 3), which presses it against one side or the other of the mortice in which it is placed in the beam CD, by changing the position of the pieces AB to the other side of the projection

Fig. 3.



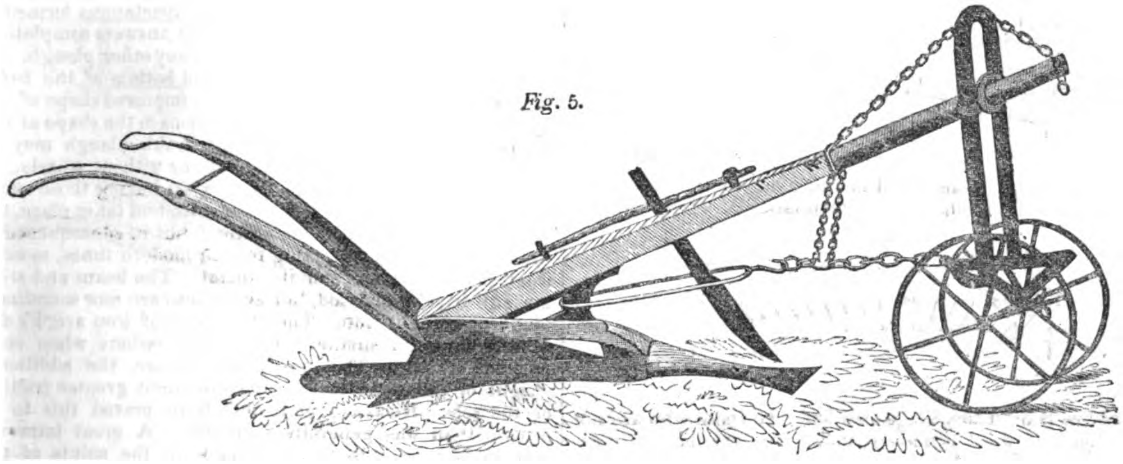
E on the beam, and pressing the head of the coulter F to the other side. The mould-board has a hook at the fore part, which goes into a staple in the side of the fore-part of the body of the plough towards the preceding furrow: a piece of wood on the inside of the mould-board keeps it at the proper angle with the line of the sole.

Fig. 4.



Kentish Turn-Wrest Plough.

Fig. 5.



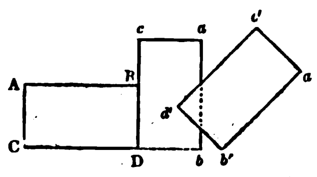
Ransom's Kentish Turn-Wrest Plough.

The defect of this plough is in its weight and clumsiness more than in the shape of the mould-board; for when it is made lighter, it is not so bad a construction as appears at first sight, and it does its work very neatly in heavy loams with a dry subsoil. If, instead of one mould-board, two were used alternately, of a better shape for turning over the furrow-slice, this plough would be much improved.

The form of the turn-furrow is of material importance, for on this depends not only the perfection of the work, but also the lightness of the draught. When we follow a plough working in a mellow soil which slightly adheres to the plough, we often perceive that, instead of being turned aside, the earth is carried forward, and only falls off when the accumulation of it becomes heavy enough to overcome the adhesion. It does not slide off from the mould-board itself, but separates from the earth which adheres to the latter; thus showing that the shape is defective, and giving good hints for its improvement. But as the same plough will sometimes turn over the same earth better when it is either drier or moister, it is very difficult to determine, by experiment only, what may, on the whole, be the best shape. A little reflection and the application of scientific principles may greatly assist us here. It is not sufficient however to find the curve which will make the plough go through the ground with the least force. The plough must also perform its work perfectly, and if anything is to be sacrificed, it is better to employ more power than to plough the ground badly. After having ascertained the mechanical principles which bear on the working of the plough, we must observe its action carefully, follow the plough day after day, in different soils and different weather, and thus we may be led to observe all the circumstances which attend its operation, and correct any mistakes which an erroneous theory might have led to.

Many attempts have been made to ascertain the exact curve which the turn-furrow should have to perform the work well and at the same time to produce the least resistance. The difficulty of the problem lies in determining the data, or principles on which the investigation is founded; and these are so various, that it is not surprising that no very satisfactory conclusion has yet been obtained. We will make an attempt at a solution from a simple examination of the motion to be produced in the portion of earth to be turned, which we call the furrow-slice. We shall suppose this separated from the adjacent soil by the vertical cut of the coulter, and at the same time from the subsoil by the horizontal cut of the share; a section of the slice, by a plane at right angles to the line of the ploughing, will be a parallelogram A B D C (*Fig.* 6), the depth A C being the thickness of the slice, and A B its width. Confining our attention to this section of the slice, the object is to move it from its position A B D C, as cut off by the coulter and share, to that of $b'd'c'a'$, where it is

Fig. 6.

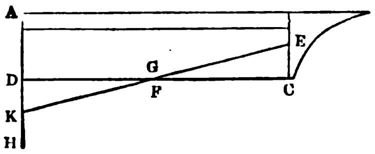


inclined at an angle of 45° to the horizontal line; the surface A B ($b'a'$) being laid on the slice previously turned over, so as to bury the grass or weeds which might be rooted there, exposing the roots to the sun and air. The more uniformly this motion is produced, and the more regularly the successive sections follow each other, the less power will be required to turn over the whole slice. The motion of C D round the point D must therefore be uniform. If the turn furrow is horizontal at the point where it joins the share, and of the same width as the furrow-slice, it will slide under the slice; and if the vertical sections of its upper surface, at equal distances from the share, are inclined at angles regularly increasing with this distance till it arrives at the perpendicular, the turn-furrow will, as it advances, turn the slice from a horizontal to a perpendicular position: the section of it will then be D*cab*. The inclination of the section of the turn-furrow must now be to the other side, forming an obtuse angle with the section of the sole, until it has pushed the slice over at the required inclination of 45°

which theory and experience have shown to be the best adapted to expose the greatest surface to the action of the atmosphere, and likewise to form the most regular furrows for the reception of the seed, which the harrow can then most readily bury.

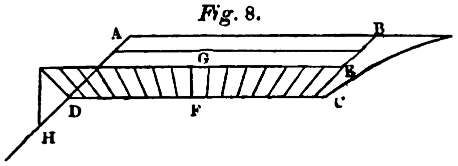
The surface of this turn-furrow is curved in the form of the spiral thread of a screw, such as would be generated by a line moved uniformly forward in a direction at right angles to its length, while it revolved uniformly round one of its extremities. This surface is easily constructed mechanically thus: take a rectangular parallelogram A B C D (*Fig.* 7) of the width of nine inches, or as wide as the intended furrow, and of a length equal to four times the width. Bisect B C in E and DC in F; at F raise a perpendicular F G to the plane of the rectangle, and make it equal to C E. Join E G and produce it to K, making F K equal to F E. Join K D. Draw from every point in C D lines at right angles to C D, meeting the line E K in different points: these lines will form the required surface.

Fig. 7.



The line K D will be found inclined 45° to the horizon at the angle K D H, which is the inclination at which the furrow-slice is most advantageously laid. To those who are not familiar with solid geometry, these lines may be easily exhibited by means of a wire inserted at E and bent at a right angle at K, inserting the bent portion into the board A B C D (*Fig.* 8) at D, so that it shall be inclined 45° at D, lying in the direction E K in *Figs.* 7 and 8. Care must be taken that G F be equal to C E and perpendicular to the board.

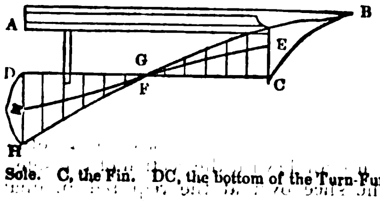
Fig. 8.



It is evident that, as the plough moves on, a particle at E will slide along the line E K, become at G perpendicular to the bottom of the turn-furrow, which should be parallel to the sole, and at K be at an angle of 45° with that line. If the slice were a solid substance, this line E K would be all that is required to turn it in its proper position; but as the soil is generally loose, and would crumble to pieces, a support must be given to it by a surface at least as wide as the slice. This surface is generated by drawing lines from different parts of D C at right angles to this line, and meeting the line K E (*Fig.* 9). These lines will be at different angles to the horizon, nearly horizontal at C, where the fin of the point begins perpendicular at F, and at 45° beyond it at D. The curve thus generated will be found to turn over soils of a moderate tenacity very perfectly. If it is very light, the surface may be formed by arcs of circles with a considerable diameter, the concave part upwards; if it is very tenacious, the convex part of the arches may be upwards. Thus the surface may be varied without altering the fixed line E K. The annexed figures (10, 11, 12) will explain this. The distance of the perpendicular F G from the fin of the share may also be varied, either lengthening or shortening the turn-furrow, as experience may show to be most advantageous.

Horizontal Plan of the Plough.

Fig. 9.



AB, the Sole. C, the Fin. DC, the bottom of the Turn-Furrow.

Sections of the three different turn-furrows at different distances from the heel.

Fig. 10.

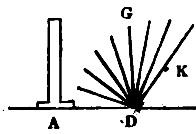


Fig. 11.

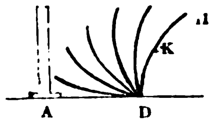
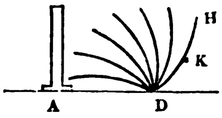


Fig. 12.



A plough has been lately constructed on this principle by Messrs. Ransom of Ipswich, at the suggestion of the writer of this article, and exhibited at the meeting of the Royal Agricultural Society of England, held at Cambridge, July 15, 1840. It promises to realise the expectations formed of it. In soils of a loose mellow nature it answers completely, and does the work more perfectly than any other plough. It unites the parallelism of the sole and bottom of the turn-furrow of the Flemish plough with the improved shape of the turn-furrow. By adopting the variations in the shape of the turn-furrow which we have suggested, this plough may be adapted to any soil, and be used with or without wheels.

Ploughs were formerly made of wood having those parts covered with iron where the greatest friction takes place, the share and coulter only being of iron; but in consequence of the greater facility of casting iron in modern times, most of the parts are now made of this metal. The beam and stilts are still usually of wood, but even these are now sometimes made of wrought-iron. The advantages of iron are, its durability and the smaller friction it occasions when once polished by use. The inconveniences are, the additional weight of the instrument, and consequent greater friction of the sole. Recent experiments have proved this to be greater than was generally suspected. A great improvement has been introduced by making the points of the shares of cast-iron, which, by a mode of casting the lower surface on a plate of metal, makes one surface much harder than the other; and as the softer surface wears more rapidly, a sharp edge is always preserved.

The different parts of a plough are now usually cast, so that if any one fails or wears out, it can be instantly replaced by moving a few screws or bolts. This is a very great saving of time and expense; for before this, every time an accident happened to any part of the plough, it took a long time to repair it, and in the mean time the labour was suspended, often at a very critical time of the year. There is another advantage in having the essential parts of cast-iron. If any particular shape has been once discovered to be the best for any part, that shape is preserved without deviation in every plough made on the same pattern, and with respect to the turn-furrow this is of the greatest importance.

The stilts of the plough are mostly of wood. Where the soil is light and crumbling, without stones, as in Norfolk, a single handle or stilt is sufficient; but where some force is occasionally required to prevent stones or other obstacles from turning the plough out of its course, two stilts are most convenient, placed at a more obtuse angle with the sole of the plough.

The force required to draw a plough depends not only on the nature of the soil, but also on the shape of the plough, and especially on the position of its different parts with respect to each other, so that they do not counteract each other.

If a plough were drawn in the direction of the sole, the obliquity of the turn-furrow would cause it to turn towards one side, and it would require a considerable force to keep it straight. In order to prevent this, the line of draught is placed at an angle, which varies with that of the turn-furrow and the force required to push the furrow-slice over. To adjust this angle, so as to cause the plough to keep in the intended line, there is a contrivance at the end of the beam to change the position of the ring by which the plough is drawn to the right or left of the line of the beam, and another by which it may be raised or lowered. In most ploughs the beam, having been originally set at a small angle with the sole towards the right, has an arch of wood

Fig. 13.

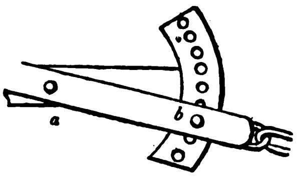


Fig. 14.

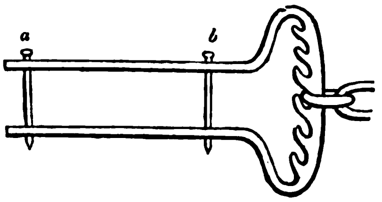
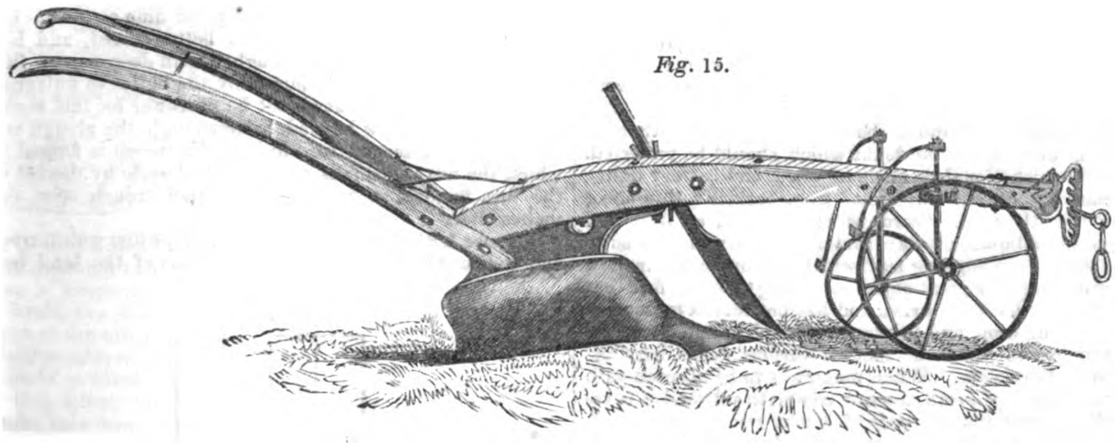
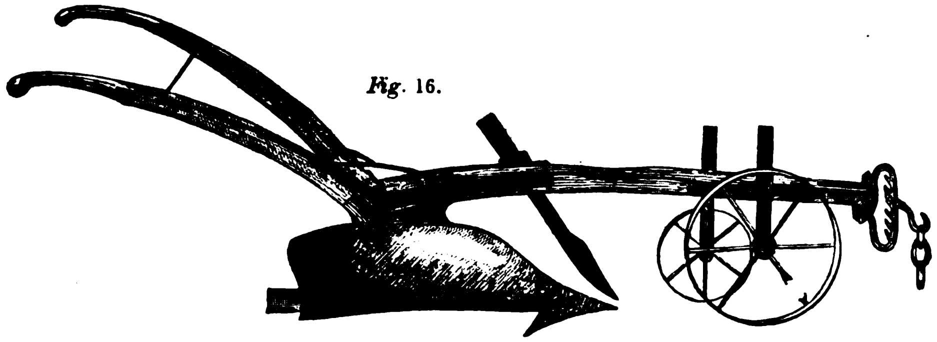


Fig. 15.



Ransom's Rutland Plough.

Fig. 16.



Bedfordshire Plough with Wheels.

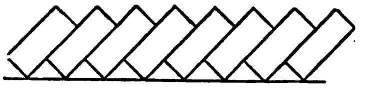
or iron at the end, as in the annexed *Figure* 13. An iron, shaped as in *Fig.* 14, is made to embrace the beam, to which it is attached by a pin (*a*), round which it turns as a centre. Another pin (*b*) passes through one of the holes in the circular end, and keeps the iron in any required position to the right or left of the line of the beam. The end of this iron, which is called a bridle, has several projecting hooks in the oblong curve which terminates it, on which an iron ring is hung at different heights. By these contrivances the plough may be drawn from a point on either side of the beam, and higher or lower as may be required. When the plough is found to *take too much land*, as ploughmen say, that is, tends to increase the width of the slice cut off by the coulter, the bridle is shifted to the left by moving the pin (*b*) into another hole: when it goes *out of the land*, as it is called, that is, diminishes the width of the furrow-slice, the pin is moved a hole or two to the right, until the plough has no tendency to deviate to either side. If it inclines to rise out of the ground, the ring is shifted in the iron bridle and placed in a hook or notch higher up; if, on the contrary, it dips too deep, the ring is hooked lower. Thus a plough may be made to go straight and at a regular depth, without any more force being applied to the stilts than is required to counteract inequalities in the land, or accidental obstacles, such as stones or roots, which might throw the plough out of the ground. When the soil is of unequal texture, it is useful to have a small wheel connected with the fore part of the beam, so as to prevent its dipping downwards, which would require a great pressure on the stilts to keep the point of the share up, and thus increase the friction of the sole on the ground, and consequently the labour of the horses. In the Rutland and Bedford ploughs two wheels are connected with the beam, one of which runs in the furrow to the right, and the other on the unploughed soil to the left. When the plough has been well adjusted, and the larger wheel runs in the angle of the furrow, it acts as a gauge to regulate the width of the slice as well as its depth: in very uniform soils without stones, the plough, when set in the proper direction, will make a very straight and even furrow parallel to the one in which the wheel runs, without any person holding the stilts; so that all that is required is to turn the plough at the end of each furrow, and set it in to the proper line to form the next. As this admits of very correct adjustment, no unnecessary force is required to draw the plough: and hence this plough appears to be the easiest for the horses; and if the wheels are not very heavy, and the plough is of a good form, it certainly requires less power to move it than many which are without wheels; and it is far superior to the old clumsy wheel-plough, the beam of which rests on a heavy carriage, without being firmly attached to it. This, instead of lessening the draught, increases it by all the pressure of the beam upon the carriage, besides the weight of this last and of the wheels. There are some very irregular and stony soils, where a common swing plough can scarcely be kept steady without the help of wheels, and where it would not be so convenient to have the beam fixed on the wheels. In this case a separate carriage is necessary, that the ploughman may have a fulcrum on which he can raise his plough, or turn it to either side to avoid any considerable stone or other obstacle. As a general rule, it may be safely asserted that a slight but strong swing-plough, in the hands of a clever ploughman,—with one wheel in particular soils, but, in general, without any wheel,—will effect its purpose with the greatest precision, and the least exertion of the horses drawing it. Theory and practice agree in this; and if any experiments appear to throw a doubt upon it, we shall probably find some circumstances which have influenced the result, when wheel-ploughs have appeared to require the least power of draught. But wheels have one advantage: they will enable an inferior ploughman to make better work than he could possibly do without them; and that too with less labour to the horses; because, from his want of skill, the swing-plough would be continually subject to sudden deviations, requiring him to use his strength to counteract them; and each exertion of the ploughman adds to the labour of the horses.

Some interesting experiments have been made on the draught of different ploughs by Mr. Handley, M.P. for Lincolnshire, and Mr. Pusey, M.P. for Berkshire, which are detailed in the third and fourth numbers of the Journal of the Royal Agricultural Society.

Without entering into any comparison of ploughs differently constructed, it is evident that the shape of the plough must vary with the nature of the soil which it is to turn up. A light soil must be shovelled up; a mellow one may be turned over with any kind of mould-board; a very stiff tenacious soil which adheres to any surface pressed against it, will be more easily turned over by a few points of contact which do not allow of adhesion. Hence the point and turn-furrow have been made of all imaginable shapes, and while one man contends for a very concave form, another will admit of nothing which is not very convex. That plough will no doubt have the least draught which is best suited to the soil which it has to move. The lighter the plough is, consistently with sufficient strength, the less draught it requires, all other circumstances remaining the same. Lightness and strength combined are consequently great advantages, and if a very light plough does its work as well as a heavier, there can be no doubt that it is preferable. Durability is nothing compared with the saving of one horse in three: it is cheaper to have a new plough every year than to keep an additional horse all the year. If a wooden plough is found to be more easily moved than an iron one, there can be no doubt which should be preferred.

The Flemish plough is made of wood, and is very light; the share and coulter only are of iron, besides a thin sheet of iron over the mould-board, which is shaped as if it had been rolled obliquely over a cylinder, a shape well adapted to sandy soils. In ploughing land which is more or less mellow and crumbling, the great object is to bring to the surface that portion which has lain buried, and has not served to nourish the preceding crop, and to bury that which has produced vegetation, and in which the roots of various weeds have established themselves. When manure is to be covered with a certain depth of earth, a more complete subversion is required, in order that no part of it may remain uncovered. When the land is in a compact state, from the roots which pervade it, and it is only ploughed once to prepare it for receiving the seed, much greater nicety is required to lay the slices at a certain angle so as to leave regular lines or depressions in which the seed may fall and be readily covered by the harrows which follow. In this case the angle of 45° is found to be the most convenient at which the furrow-slices may be laid against one another. The field will then have the appearance of being laid in small ridges as in the annexed figure, all towards the same side if ploughed with a turn-wrest plough, or towards a middle line if a plough with a fixed turn-furrow has been used. To produce this regularity, the end of the turn-furrow is made to press on the slice turned over; and some ploughmen fix a piece of wood or iron to the end of the turn-furrow, which makes a groove in the furrow-slice at the place where the next one will be laid upon it. This prevents useless openings between the slices. It adds no doubt to the draught, but it makes better and neater work.

Fig. 17.

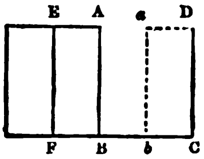


When the seed is to be dibbled on the sward, which is reversed by a single ploughing, it is necessary that the sod should be completely turned over and laid flat. To do this, and at the same time to bury all the grass, requires the furrows to be very equal and parallel; so that when a roller has gone over the land, it is perfectly flat, without any interstices between the slices which are turned over. It requires a good ploughman to do this perfectly.

When clover-ley or old grass is ploughed up, it is difficult to bury all the grass which grows on the edge of the slice; and if it remains exposed, it will grow and increase to the detriment of the corn. To prevent this, a wing is sometimes added to the side of the coulter, a few inches from the point. It cuts a small horizontal slice off the surface before the sod is turned over, and this falls into the bottom of the furrow and is buried there. The coulter with such a wing is called a skim-coulter, because it, as it were, skims the surface. This instrument may require an additional horse to be put to the plough in tenacious soils, but this cannot be avoided. There is no doubt that no more horses should be put to a plough than can do the work; but whatever be the number required, the work must be done well. There is no saving in doing the work imperfectly. The discussions about the number of horses which should draw a plough might easily be settled, if the nature of the soil were sufficiently taken into consideration. The shape of the plough may make some difference, but the tenacity of the soil makes a much greater. It is however not a little surprising that there should be so little variety in the width of the furrows. It would appear as if there were a law prohibiting furrows less than eight inches wide, or more than ten: a furrow-slice five inches wide and ten deep requires no more power than one ten inches wide and five deep. It is true that a plough will not do more than half an acre at most in a day with narrow furrows; but if two horses will do this, and two ploughs instead of one be used, with one man and two horses each, an acre will be ploughed in a day with four horses and two men, which is the number usually employed, when the furrows are deep and nine or ten inches wide; but the land will be much better stirred, and laid more even. The Romans ploughed with deep narrow furrows, and varied the width purposely, the better to pulverise the soil. The plough need not be narrower for this work; for if the first furrow be made wide enough, the plough can deepen it by a second turn in it, and a trench is formed in which the next slice falls, and is pushed aside by the tail of the turn-furrows, so as to leave another trench open ten inches wide.

Suppose ABCD (*Fig.* 18) the section of the first wide furrow, and a slice AEFB is cut off the solid side of the land half the width of the trench; the mould-board pushes this earth, after it has been turned over, into the space DC*ab*, marked with the dotted line, and in doing so beats and crumbles it, leaving a fresh trench *ab*FE equal to the first, and so the whole field may be ploughed without difficulty. In nine cases out of ten, where the soil is properly cultivated, and ploughed in a proper state, this mode of ploughing would be found a great improvement, and equal to a trench ploughing, or subsoil ploughing. Where the farms are small and few horses are kept, deep ploughing is not practicable with the usual width of furrow; but with a narrow furrow, the land may be moved to a very great depth with a couple of horses. The plough must be made sharp and narrow, and the turn-furrow not much curved, so as rather to push the earth aside than to lift it.

Fig. 18.



Very little attention was formerly paid to the straightness of the furrows. It was natural to follow the shape of the boundary of the field, which was seldom straight; and this practice increased gradually till no straight furrow was to be seen; and there was a prejudice, if not a superstition, in favour of crooked ridges. Those who defended them with the least vehemence, asserted that if crooked furrows were not better than the straight, the difference was unimportant; but no curves can be laid so perfectly parallel as two straight lines. Every deviation from parallelism causes a defect in the contact of the slices, and a loss of force by the obliquity of the draught. A superficial observer would not perceive this, but minute examination proves it. Hence equal and straight furrows are a sign of good ploughing.

When the land lies on a dry subsoil, and no more moisture remains in it, after continued rains, than is useful to promote vegetation, it may be ploughed quite flat. This may be done by a plough with a moveable turn-furrow, or by ploughing in a continued spiral from the centre to the circumference, or the reverse. In this case straight furrows cannot be made. The best way is to draw a furrow the whole length of the field in the middle, and plough towards this from both sides. If the field is wide, it is most convenient to plough it into several broad stitches, each a certain number of perches in breadth. A perch (16½ feet) is a very common width for a stitch, and convenient to guide the sower or the drilling-machine.

But on moist impervious subsoils it is necessary to lay the land in a rounded form, in order to let the superfluous water run off into furrows, from which it is conducted by proper channels into the ditches. In this case half a perch is a common width for each stitch, or land, as it is sometimes called. It requires some practice to lay up a land in a rounded form from a flat surface. After cross-ploughing and harrowing, the first furrow is drawn wide and shallow, and the earth is thrown upon the surface to the right: when the plough returns, it takes another furrow about nine or ten inches from the first, laying the earth or furrow-slice somewhat obliquely over the first. At the next turn another slice is laid, meeting the last at an angle, the first slice being quite covered by the two last. This now forms the crown of the ridge; and the succeeding slices are laid obliquely, leaning to the right and left till the required width is obtained. Another land is now begun at the distance of a quarter of a perch from the last furrow, and laid exactly in the same manner. When the two lands meet, the intervening furrow, which had been purposely left shallower, is deepened; and there is a furrow between every two lands, the bottom of which is considerably below the bottom of the other furrows. When this field is ploughed again after harvest, the work is reversed; the furrow between the lands is filled with the first slice, and another is placed over this, which now becomes the crown of the land to be formed: this is called ploughing crown and furrow. When the lands are ploughed towards the crown, it is called gathering. By gathering several times in succession, the soil is much raised at the crown at the expense of the sides. This was the old practice, when lands were laid very wide and very high; in common fields, the land or stitch was often the whole width of the possession, from which came the name of land. In Scotland they are called riggs.

Fig. 19

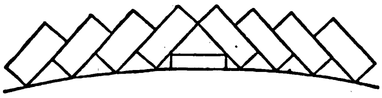
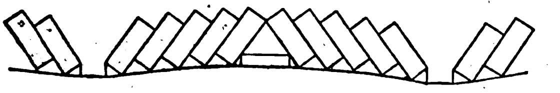


Fig. 20.



One of the most useful operations in ploughing land is to cross the former furrows, by which means the whole soil is much more completely stirred; and if any part has been left solid without being moved by the plough-share, which is called a balk, it is now necessarily moved. The leaving of balks is a great fault, and is owing to the sole of the plough being narrower than the furrow-slice, and the wing of the point too short, or to the ploughman not holding his plough upright. The share should cut the ground to the whole width of the furrow, that no roots of thistles, docks, or other large weeds may escape and grow up again. The Roman authors recommended the use of a sharp rod or stake inserted horizontally into the ground, to discover if there were any balks, which, with their ploughs, must have been often left, if the ploughman was not very careful to make close and small furrows. Many ploughmen hold the plough in an oblique position; the bottom of the furrow is consequently not level, and the soil is not stirred equally. This is a great fault, especially in wet ground; for the furrows thus become channels in which the water remains, not being able to run over the inequalities of the bottom. It is of no use to lay the surface convex, if the solid earth below lies in hollows or gutters. The water naturally sinks down into the newly-ploughed land, till it meets the solid bottom which the plough has gone over; if it can run over this into the deeper furrows between the stitches, it evaporates or runs off, and the land is left dry, and so consolidated as to let the water run along the surface without sinking to any depth; but if the bottom is uneven, it remains in the hollows, and stagnates there, to the great injury of the growing crops.

There are various modes of ploughing land when it is intended to pulverise and expose it to the sun in summer, or the frost in winter, to purify and fertilise it. To expose as great a surface as possible, the whole field is laid in high and narrow ridges, bringing to the surface all the fertile portion of the soil, and often also a portion of the subsoil so as to deepen the productive portion and give more room for the roots to spread in. The simplest method of increasing the surface exposed, when the land is first broken up from pasture, or after having been some years in grass, and is in a foul state, is called ribbing. The plough turns up a slice, which it lays over flat on the adjoining surface. It does not cover this with the next slice, as if it were beginning the crown of a stitch, but it takes another slice at some distance, and then one parallel to the first, likewise laid flat on the solid part. When the whole field has been so ploughed, the surface consists altogether of ridges and furrows; but only half the surface has been ploughed. No grass appears, if it has been well done, the unploughed strips being covered by the slices raised by the side of them, the two surfaces with grass on them cover each other. It is left in this state till the grass is rotten, and when the sod is broken to pieces by heavy drag-harrows, the land can be cross-ploughed and cleaned or fallowed in dry weather.

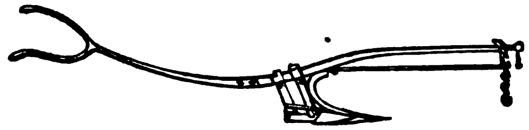
There is another mode of ridging, when the land has had one or two ploughings, in order to expose it to the frost in winter, and to mellow it. The operation is somewhat similar to ribbing, but after the first slice is turned over, another is added, as deep as the plough can be made to go, so as not to bring up the subsoil; by this means the whole surface is laid in high ridges and deep furrows; and when this ploughing is reversed, in spring, the soil which has been exposed to the frost and wind is mixed with the rest, and tends greatly to mellow it. This is an excellent preparation for turnips, if the land has been well cleaned. The manure, being distributed in the deep furrows, is covered by the plough right and left, or at one operation by a plough with a turn-furrow on each side, which divides the ridge and lays half of it in each contiguous furrow. This plough is usually called a double mould-board plough, and is extremely useful in many operations of husbandry.

In order to save hands and expedite the tillage of the land, ploughs have been contrived which make two or more furrows at once. When they are well-constructed, they are very useful in light soils. If it is not required to go deep, and two horses can draw a double plough, there is a decided saving of power; but if it requires four horses, nothing is gained. The double ploughs are therefore not much in use. But there are instruments which cultivate the earth, stirring and pulverising it much more speedily than the plough. Some of these will stir the ground to the depth of seven or eight inches, going over a width of five or six feet at once. Such an instrument is preferable to the plough, after the ground has already had a certain degree of stirring, and is become mellow and crumbling; but to break up pasture or clover-ley, there is nothing so efficacious as the plough, which cuts regular slices and lays them over, so that all the grass shall rot, and the roots, being exposed to the air, shall decay, and thus furnish food for other crops.

The instruments which have been invented to save the time and labour required by repeated ploughings are very numerous. Some of the most useful have been noticed before. [Arable Land.] New ones are daily invented, and some are supported by wheels, which render them both lighter and more convenient. They are easily raised out of the ground, when not intended to work, and the depth to which they are let down is more easily regulated.

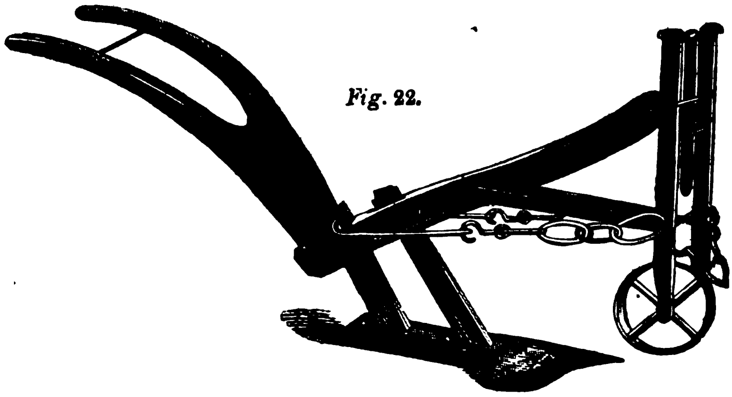
Deep ploughing is generally acknowledged to accord with the best husbandry, where the subsoil is dry naturally, or has been artificially drained; but some inconvenience may arise from bringing a barren subsoil to the surface, in trench-ploughing by two ploughs following each other in the same furrow. It has therefore been suggested to take off the turn-furrow from the plough which follows the first, so as to stir the subsoil without bringing it to the surface. [Arable Land.] This idea has been improved upon by constructing a subsoil-plough of great strength, which will go very deep into the ground and stir the subsoil a foot or more below the bottom of the usual furrow. Mr. Smith of Deanstone has invented one made entirely of iron, and Sir E. Stracey has constructed another with a small wheel in front very strongly put together, although the beam is of wood. It is of somewhat lighter draught than Mr. Smith's, but it does not go quite so deep. This plough requires four horses in the most favourable soils, and six in tenacious clays, to keep up with the common plough, which always should precede it. Sometimes however the subsoil-plough may be used alone, where the surface is already mellow and crumbling. The figure of each of these ploughs, which is subjoined, requires little explanation when the purpose for which they are used is understood

Fig. 21.



Smith's Subsoil Plough.

Fig. 22.

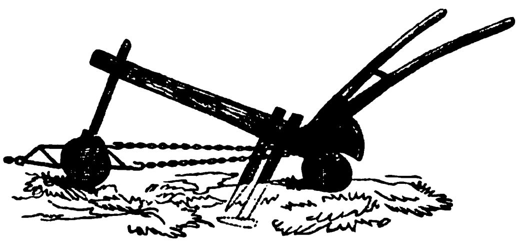


Stracey's Rackheath Plough.

Many different ploughs have been invented for the purpose of saving labour in draining land. As they all cut out a slice from the bottom of a furrow and raise it up to the surface of the ground, they are of little use in crumbling soils, and in the most tenacious require the assistance of much manual labour to complete the work. They act on the principle of the carpenter's tool by which a groove is formed in the edge of planks or deals, when they are intended to be joined closely as in a floor. This instrument is also called a plough; but the uniform tenacity of the wood allows a narrow chisel to cut an even regular groove. In the draining-plough the two sides of the drain are to be cut obliquely downwards and the bottom scooped out evenly. The plough requires to be often adjusted, and the deep furrows to be kept cleared from loose earth by means of spades and scoops. In this way drains may be made from 15 to 18 inches deep, in which loose stones or tiles may be laid to form a channel for the water. The expense is much less than when the drains are made with the spade.

When grass-land lies low and wet on a very tenacious subsoil, a plough is sometimes used which consists of a cylinder of iron pointed at one end, and connected with a strong beam by a thick plate of iron, which is sharp on the side nearest the point of the cylinder, and acts as a coulter. This instrument is forcibly drawn horizontally through the stiff subsoil at a depth of 12 to 18 inches, so as to leave a round channel like a pipe where the cylinder has passed. This has been called a mole-plough, the passage made by it under ground resembling the workings of a mole. It takes six horses to draw this plough, when the cylinder is 15 inches under the surface, but it is the most easy and expeditious means of temporarily draining land. It can only be done when the soil is moist and gives way without cracking, but at that time the feet of the horses greatly damage the surface. In consequence of this a windlass with a long chain has been invented. The drum, which is vertical, and round which the chain is coiled, is turned by a horse who walks round and round, while the whole apparatus is kept in its place by means of an anchor fixed in the ground. It draws the mole-plough the length of the chain, and is then moved forward on small wheels while the chain uncoils. As soon as the chain is all off the drum, the anchor is refixed and the operation continues. This mode of draining land has now been almost entirely superseded by a more regular and permanent system of draining with stones or tiles. The channels made by the mole-plough are very apt to fill up in dry weather; and the mole takes advantage of a ready-made passage to work in it, stopping it purposely to retain water and to form its nest. When this is the case, the water springs to the surface and does much harm. Nothing but a fresh application of the mole-plough parallel to the old channels can remedy this evil.

Fig 23.



Lumbert's Mole Plough.

Various ploughs have been constructed with the intention of diminishing the draught, or improving the form of the turn-furrow; but most of them, without much regard to scientific principles, merely from a vague notion founded on some real or supposed defect in the ploughs in common use, or in order to adapt them to particular soils and situation. It would be useless to take notice of many of them, which have but little merit, and are not generally approved of. At the meeting of the Royal Agricultural Society at Cambridge in 1840, Messrs. Ransom, of Ipswich, exhibited no less than eighty-two differently constructed ploughs, giving an excellent opportunity to those who wished to compare the principles on which they are constructed, and the manner in which these principles are applied.

PLOUGH-MONDAY, the Monday next after Twelfth Day, fixed upon by our forefathers as the period when the labours of the plough and other rustic toils begin. In Derbyshire, and in some of the northern counties, the young men formerly used to yoke themselves and draw a plough about with music on this day; one or two persons, disguised in antic dresses, like jack-puddings, accompanying them, and going from door to door, soliciting plough-money to provide drink. In some places it was a custom, if the ploughman, after that day's work, came with his whip to the kitchen hatch, and cried 'Cock in the pot,' before the maid could cry 'Cock on the dunghill,' he gained a cock for Shrove-Tuesday. Tusser, in his 'Five Hundred Points of Husbandry,' mentions Plough-Monday among the ploughman's feast-days.

(Brand's *Popular Antiq.*, 4to., 1813, vol. i., pp. 396, 397; Brady's *Clavis Calendaria*, 8vo., 1812, vol. i., pp. 151, 152; *Lady's Dictionary*, by N. B., 8vo., Lond., 1694, p. 377.)

PLOVERS, CHARA'DRIADÆ, a family of birds placed by Mr. Vigors in the order *Grallatores*, or *Waders*. The genus *Charadrius*, including the *true Plovers, the Dotterell, the Sea-Lark, the Sanderling, the Stone Curlew* (*Œdic-*

nemus), *the Long-legged Plover* (*Himantopus*), and the *Spur-winged Plover* (*Charadrius Spinosus*), was placed by Linnæus, in his *Systema Naturæ*, between the genera *Tringa* and *Recurvirostra* [Avoset], in his order *Grallæ*.

Cuvier makes the family of Plovers (*Les Pluviers*, *Charadrius*, Linn.), comprising those genera which want the hind-toe, and have a moderate bill compressed and convex at the end, consist of two genera, *Œdicnemus*, and the Plovers properly so called (*Charadrius*, Linn.), embracing the *Golden Plover*, *Charadrii Morinellus*, *Hiaticula*, &c. The Plovers are succeeded by the *Vanneaux* (*Vanellus*, Bechst., *Tringa*, Linn.), consisting of *Squatarola*, Cuv., and *Vanellus*, Cuv.; which are followed by *Hæmatopus* and *Cursorius*; after which last, judging from external form, he places the Cariama (*Microdactylus*, Geoff., *Dicholopus*, Ill.). [Cariama.]

Mr. Vigors is of opinion that we are introduced to this family by means of *Hæmatopus*, Linn., which indicates its affinity to the lobated *Fulica* of the preceding family *Rallidæ* by the rudiments of the membrane that extends along the toe. This character, he observes, is sufficiently discernible in the species so frequent on our coasts [Sea Pie]; but it is so far conspicuous in an Australasian species as almost to give its foot the appearance of being perfectly lobated. This genus, he remarks, by its habits of swimming, preserves an affinity with the natatorial groups of the *Rallidæ*; and these again being connected with *Phalaropus*, which forms, in Mr. Vigors's arrangement, the extreme genus of the *Scolopacidæ*, the whole of the *Wading Birds* that possess the faculty of swimming are brought together into one contiguous group. Besides *Hæmatopus*, the *Charadriadæ* of Mr. Vigors consist of *Arenaria*, Briss., our common Sanderling; to which he feels inclined to add *Strepsilus*, Ill., and *Vanellus*, Briss., which have been separated from *Tringa* and generally assigned a place near *Arenaria*. Mr. Vigors observes that it is true that both these genera possess a hind toe; but that member, he adds, is at the same time so small and feeble as scarcely to form more than a rudiment; and in the structure of their bill, and more particularly in their habits, they evince a more natural union with the *Charadriadæ* than with *Tringa*, where a strict adherence to the structure of the foot would place them. The genus *Cursorius*, Lath., also appears to Mr. Vigors to come among these groups, which are joined by the true *Charadrius* of authors. Among the numerous species of this latter genus he notices some that are distinguished from the rest by the greater elevation of the *tarsi*. These, in his opinion, lead us to the genus *Himantopus*, Briss., which exhibits such a singular and apparently disproportioned length of limb. The family is terminated, according to the theory of Mr. Vigors, by the *Œdicnemus* of Cuvier [Œdicnemus], which, by its affinity with the earlier groups of the *Gruidæ*, connects, in his view, the present family with that (*Gruidæ*) which commenced the order *Grallatores*. He reminds the reader that the family of *Struthionidæ* among the *Rasores* is closely allied to the *Gruidæ* and equally so to the *Charadriadæ*, in consequence of the absence of the hinder toe. With the latter, indeed, he observes, it is frequently united into one group, from their similarity in this character, and the cursorial habits resulting from it, which are common to both. These three naturally allied families therefore are thus, in Mr. Vigors's opinion, brought into contact, and their mutual affinity preserved; while at the same time they retain in the system the various stations into which the difference in their more important characters tends to separate them. (*Natural Affinities that connect the Orders and Families of Birds*, in *Linn. Trans.*, vol. xiv.)

M. Lesson makes the family *Charadriadæ*, Leach, consist of *Ostralega*, Briss.; *Calidris*, Ill.; *Erolia*, Vieill.; *Cursorius*, Lath.; *Strepsilas*, Ill.; *Squatarola*, Cuv.; *Vanellus*, Briss.; *Pluvianus*, Vieill.; *Charadrius*, Linn.; *Burhinus*, Ill.; *Œdicnemus*, Cuv.; and *Himantopus*, Briss. (*Manuel*.)

The *Charadriadæ*, or Plovers, are considered by Mr. Swainson to form the subtypical family of the order *Grallatores*, and they seem to him to be connected to the *Ardeidæ* through the medium of the Cranes, the Thick-knees (*Œdicnemus*), or probably by the genus *Cariama*,—a form, by the way, which Mr. Swainson admits that he has never minutely examined. He observes that in this comprehensive group the feet are long and slender, formed for great speed, the toes short, and the hinder one generally wanting, the wings long, and the powers of flight consequently great. 'Herons and Rails,' says he, 'seek the most secluded recesses of marshy shades. Plovers and Sandpipers, on the contrary, live only on sandy and unsheltered shores, or on exposed commons; they congregate in flocks, and run with great swiftness; their heads are thick, and their eyes large, dark, and placed far back in the head; the bill is short, with the basal half soft, but the outer half becomes abruptly thick, and is often obsoletely notched, so as closely to resemble that of the pigeon family, which, in the Rasorial circle, appears to represent the great order of Waders. The following genera are the most prominent types:—The Oystercatchers are rather large and strong birds, marked with black and white; and their principal food is supposed to be oysters and other shell-fish. One species alone belongs to Europe, the others are natives of South America and Australia. The Turnstone (*Strepsilas*) is at once recognised by a short stout bill, rather turned upwards: the name is derived from the habit it possesses of turning up stones on the sea-shore, to feed upon the marine insects[*] concealed beneath. The Couriers (*Tachydromus*, Ill.), although confined to the Old World, seem to be very widely distributed· one species occasionally visits Europe, and has twice[†] been shot in England;[‡] the others, four or five in number, come from the African deserts and the sandy districts of India [Cursorius]; they are closely united to the *Pratincoles*, or Swallow-Plovers, forming the genus *Glareola*. These latter have their wings very long, their bills short, and their tails generally forked; they are small birds, and fly with great celerity. Our beautiful Lapwing forms a typical example of the subgenus *Vanellus*. The true Plovers (*Charadrius*) form a numerous group, very elegantly although not richly coloured, and dispersed, with little or no variation of form, over the whole world. The feet, as in the Spur-winged Plovers, are only three-toed, and the wings are much pointed; sometimes there is a slight membrane between the outer and the middle toe, but this is usually wanting. We have two elegant little species on the British coast, and some others occur in Southern Europe. The Longshanks (*Himantopus*) have been placed in this group, but we believe they belong to the *Tringidæ*: whatever their true station may be, they are certainly some of the most singular birds in the family; and by the excessive length of their legs, they no doubt represent the Flamingoes: we know but of three species. At the end, or rather at the commencement of this group, we may place the thick-kneed Bustards (*Œdicnemus*); since they are obviously allied to the *Charadriadæ*, or Plovers, on one side, and to the *Ardeidæ* by means of the aberrant Cranes on the other. All the species have been hitherto confined to the Old World; but another, described in this volume, has recently been discovered in the interior of Tropical America. These birds, while they exhibit a strong affinity to the typical Plovers, have many points of resemblance to the Cranes; so that we can agree with Mr. Vigors in considering *Œdicnemus* to have an affinity with the earlier groups of the *Gruidæ*, forming part of our *Ardeidæ*; and that they thus connect the present family with that.' (*Classification of Birds*.)

Mr. Swainson thus characterises the family:—

Bill short; the basal half soft, the remaining portion hard; the culmen suddenly elevated and curved. Nasal groove deep, extending to half the length of the bill. Feet long. The three anterior toes cylindrical; the hinder generally wanting. This family is placed by Mr. Swainson, in the *Synopsis* at the end of the volume above referred to, as the last of the order *Grallatores*, and embraces the following genera and subgenera:—

Squatarola, *Charadrius*, *Vanellus*, *Œdicnemus*, *Tachydromus*, *Glareola*, and *Ammoptila*.

The Prince of Musignano (C. L. Bonaparte) makes the '*Charadridæ*' the first family of the order *Grallæ*, Linn., and he comprises within it the genera *Otis*, *Œdicnemus*, *Cursorius*, *Glareola*, *Ægialites* (Boie), *Eudromias* (Boie), *Charadrius*, *Squatarola*, *Vanellus*, *Hoplopterus* (Bonap.), *Strepsilas*, and *Hæmatopus*. It must be remembered that the *List of Genera*, which gives this arrangement, applies to the Birds of Europe and North America only.

The first family of the order *Grallatores*, according to Mr. G. R. Gray's arrangement, is the *Charadriadæ*, which are divided by him into the following subfamilies and genera:—

[*] Crustacea ?

Thrice.

[‡] And once in North Wales.

Subfamily 1. *Œdicneminæ.*

Genera. *Œdicnemus*, Temm. (*Charadrius*, Linn.; *Otis*, Lath; *Pluvialis*, Briss.).

Burhinus, Ill. (*Œdicnemus*, Shaw; *Charadrius*, Lath.).

Subfamily 2. *Cursoriinæ.*

Genera. *Cursorius*, Lath. (*Charadrius*, Gm.; *Tachydromus*, Ill.); *Oreophilus*, Gould.

Ortygodes, Vieill. (*Hemipodius*, Sw.; *Ortygis*, Steph.).

Pluvianus, Vieill. (*Charadrius*, Gm.; *Cursor*, Wagl.; *Hyas*, Gloger; *Ammoptila*, Sw.; *Cheilodromus*, Rüpp.).

Subfamily 3. *Charadrianæ.*

Genera. *Glareola*, Briss. (*Hirundo*, Linn.; *Trachelia*, Scop.).

Squatarola, Cuv. (*Tringa*, Gm.; *Pluvialis*, Briss.; *Vanellus*, Bechst.; *Charadrius*, Pall.).

Vanellus, Briss. (*Tringa*, Linn.; *Charadrius*, Wagl.; *Gavia*, Klein).

Erythrogonys, Gould

Philomachus, Mœhr. (*Parra*, Gm.; *Vanellus*, Gm.; *Hoplopterus*, Bonap.).

Charadrius, Linn. (*Pluvialis*, Ray).

Eudromias, Boie (*Charadrius*, Linn.; *Pluvialis*, Briss.; *Morinellus*, Gesn.).

Hiaticula, Mœhr. (*Charadrius*, Linn.; *Pluvialis*, Briss.; *Ægialites*, Boie).

Pipis, Licht. (*Charadrius*, Licht.).

Anarhynchus, Quoy and Gaim. (*Scolopax?* Raffles).

Subfamily 4. *Hæmatopinæ.*

Genus. *Hæmatopus*, Linn. (*Ostralega*, Briss.; *Scolopax*, Scop.).

Subfamily 5. *Dromadinæ.*

Genera. *Dromas*, Payk. (*Erodia*, Stanley; *Corrira*, Briss.?)

Esacus, Less. (*Carvanaca*, Hodgs.).

We now proceed to the consideration of some of the forms included in this family.

Charadrius. (Linn.)

Generic Character.—Bill slender, straight, compressed, shorter than the head; nasal furrow prolonged more than two-thirds; mandibles enlarged towards the tip. Nostrils basal, jagged, cleft longitudinally in the middle of a large membrane which covers the nasal fossa. Toes three, directed forwards, the external united to the middle one by a short membrane; the inner toe free. Tail square or slightly rounded. Wings moderate, first quill-feather longest. (Gould.)

Head and foot of Charadrius.

Example, *Charadrius pluvialis*, Linn.

Description.—Old Male in winter plumage.—Top of the head, as well as all the upper parts of the body, wings, and tail, sooty black, marked with large spots of golden yellow, disposed on the borders of the barbs of the feathers; sides of the head, neck, and breast varied with ashy brown and yellowish spots; throat and lower parts white; quills black, shafts white towards the end; bill blackish; feet deep ash-colour; iris brown. Length rather more than ten inches.

Female.—Differing hardly at all from the male.

Young of the year.—Upper parts ashy black with spots of yellowish ash. (Temm.)

In this garb, the birds are, according to Temminck, *Charadrius pluvialis*, Gm.; *Charadrius auratus*, Suckow.; *Le Pluvier doré*, Buff.; *Golden or Green Plover*, Lath.; *Goldregenpfeifer*, Bechst.; *Piviere dorato*, of the *Stor. degl. Ucc.*; *Goud Plevier*, Sepp.

Old Male and Female in summer or nuptial plumage.—Upper parts deep black; over all the borders of the feathers are disposed small spots of a very bright golden yellow; front and space above the eyes pure white; lateral parts of the neck white also, but varied with great black and yellow spots; throat, front of the neck, and all the other ower parts deep black.

Periodical variation during the moult.—White and black mingled are often seen on the lower parts of the feathers. This livery is always to be seen on the young birds, even after their first spring moult. (Temm.)

In this state the bird is, according to M. Temminck, *Charadrius apricarius*, Gmel.; *Le Pluvier doré à Gorge noire*, Buff.; *Alwargrim Plover*, Lath.

In the fourth part of his 'Manuel,' just published, M. Temminck adds the following synonyms: *Charadrius auratus*, Naum.; *Der Platköpfige, Hochsternige, Mittlere, und Hochköpfige Goldregenpfeifer*, Brehm.; *Brockfogel*, Nils.; and *Piviere*, Savi.

This species is also *Le Pluvier Guillemot* of Belon (who says that it is named *Pluvier*, 'pour ce qu'on le prend mieux en temps pluvieux qu'en nulle autre saison,' and he gives an amusing account of the mode of taking these birds by the peasants); *Der Rechte Brachvogel* of the Germans; *Hawk's Eyes* of the Hudson's Bay residents?; *Cwttyn yr aur* of the antient British.

Habits, Food, Reproduction, &c.—Mr. Selby gives a most correct and interesting account of the habits of the bird in this country:—'About the end of May or beginning of June, the females begin to lay, making but little artificial nest, a small depression in the ground amidst the heath being generally taken advantage of, and lined with a few dry fibres and stems of grass. The eggs are four in number, rather larger than those of the lapwing, of a cream-yellow inclining to oil-green, with large irregular confluent blotches or spots of deep umber brown. The young, when excluded, are covered with a beautiful particoloured down of bright king's yellow and brown; they quit the nest as soon as hatched, and follow their parents till able to fly and support themselves, which is in the course of a month or five weeks. The old birds display great anxiety in protecting their young brood, using various stratagems to divert the attention of an enemy; among others, that of tumbling over, as if unable to fly, or feigning lameness, is most frequent, and appears indeed to be the instinctive resort of those birds that construct the nest and rear their young on the ground. When aware of an intruder near, the female invariably runs to some distance from her nest before she takes wing, a manœuvre tending to conceal its true situation; and the discovery of it is rendered still more difficult by the colour and markings of the eggs assimilating so closely to that of the ground and surrounding herbage. The usual call-note of the Plover is a plaintive monotonous whistle, by imitating which it may frequently be enticed within a very short distance. In the breeding season a more varied call is used, during which it flies at a great elevation, and continues soaring round for a considerable time. Towards the end of August these birds begin to leave the moors (having there congregated in large flocks), and descend to the fallows and the newly-sown wheat-fields, where an abundance of their favourite food can be readily obtained. At this season they soon become very fat, and are excellent at the table, their flesh not being inferior in flavour to that of the Woodcock or any of our most esteemed sorts of game. In these haunts they continue till severe weather approaches, when they either move nearer to the coast or migrate to the southern parts of the kingdom. They fly with strength and swiftness, and if disturbed, when in large flocks, generally perform many aerial evolutions and rapid wheelings before they again settle on the ground. The Golden Plover is a nocturnal feeder, and, during the day, is commonly seen squatted upon the ground or standing asleep, with the head drawn down between the shoulders. Its food consists of earth-worms, slugs, insects, and their larvæ, particularly those of the *Lepidopterous* tribe, many rare species of which I have, upon dissection, found in their stomachs and gullet during the summer season. It runs very fast, and, when wounded, is difficult to be caught without the aid of a dog.'

Utility to Man.—This species has been always considered, and most justly, a delicious dish. It figures in the old bills of fare accordingly. Thus in the account of Sir John Nevile, of Chete Knight, of the viands, &c., used at the marriage of his son-in-law Roger Rockley and his daughter Elizabeth Nevile, the 14th of January, in the seventeenth year 'of the reigne of our soveraigne lord king Henry VIII.' we find in the second course, 'Item, plover, 8 of a dish' and among the charges, 'Item, in plover, 3 doz., 5*s*.' In the charge of the said Sir John Nevile, at Lammas Assizes, twentieth of Henry VIII., we also find 'Item, 6 doz. plovers, 12*s*.' Four hundred plovers appear among 'the goodly provision' at the intronazation of George Nevell, archbishop of York, in the reign of Edward IV. Drayton, in his 'Polyolbion,' makes *Lyndsey* boast that her 'fowle' 'more ayrie are' than those of *Holland* (Lincolnshire):

> 'And make fine spirits and blood,
> For neere this batning isle, in me is to be seene,
> More than on any earth, the plover grey and greene.'

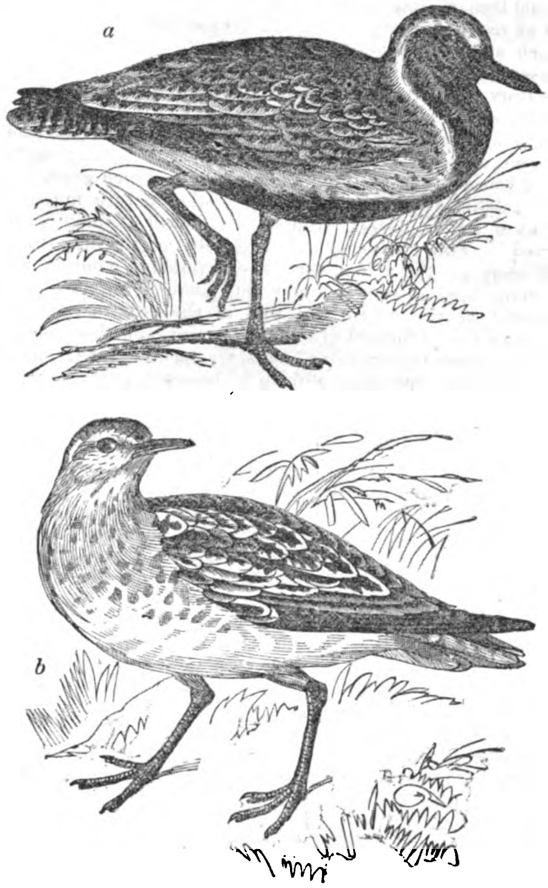
Geographical Distribution.—Very wide. There is evidence of the presence of the *Golden Plover* in each of the four quarters of the globe. Mr. Gould indeed, in his observations on the geographical distribution of the species collected by Mr. Keith Abbot in the neighbourhood of Trebizond, notices the bird as inhabiting Europe, and the adjoining portions of Africa and Asia, but not America. (*Zool. Proc.*, 1834.) Now Temminck expressly says that the species is the same in America and Asia. Sabine also (Parry's *First Voyage*) makes Wilson's *Charadrius apricarius* and the *Golden Plover* identical, and states that it breeds in the swampy parts of the North Georgian Islands in considerable abundance. Richardson states that the breeding-quarters of this well-known bird are the barren grounds and the coasts and islands of the Arctic Sea. 'It hatches,' he says, 'early in June, and retires southward in August. Numbers linger on the muddy shores of Hudson's Bay, and on the sandy beaches of rivers and lakes in the interior, until the hard frosts of September and October drive them away. At this period they are very fat, and are highly prized by the epicures of the fur countries. They make but a short stay in Pennsylvania, and are said to winter beyond the United States.' (*Fauna Boreali-Americana.*)

Captain James Ross, R.N., notices it as abundant during the breeding season in most parts of the arctic regions, and he found them plentifully in the neighbourhood of Felix Harbour, feeding in the marshes, in company with *Charadrius semipalmatus* (American Ring Plover). (Sir John Ross's *Second Voyage.*) Nuttall remarks that the bird is, according to the season of the year, met with in almost every part of the world, particularly in Asia and Europe, from Kamtschatka to China, as well as in the South Sea Islands, and from Arctic America, where it breeds, to the Falkland Islands. The Prince of Musignano (*Birds of Europe and North America*) appears, on the other hand, to agree with Mr. Gould, for the Prince makes the American analogue of *Charadrius Pluvialis*, Linn., *Charadrius Virginiacus*, Borkh. (*Charadrius Pluvialis*, Wils.), and Colonel Sykes notes it among the birds of the Deccan, and as identical with Javanese specimens, smaller indeed than one North American specimen and two English specimens in the British Museum, but absolutely identical with other British specimens. He says that it is rare in 'Dukhun,' and appears only in the cold weather. In the stomach he found beetles, land-insects, and coarse sand. (*Zool. Proc.*, 1832.) It appears among the list of birds seen in Japan by Dr. Von Siebold and M. Bürger; and Temminck states that those killed there did not differ essentially from those of Europe. Mr. Selby allows a wide geographical range to it, though not to the extent supposed by many naturalists, the birds which have been considered by them as belonging to this species being of a different one, viz. *Char. marmoratus* of Wagler. Instead therefore of extending the range of the Golden Plover to America, New Holland, and other parts of the southern hemisphere, he feels inclined to limit it to Europe, Northern Asia, and some few districts in the North of Africa. (*British Ornithology.*)

Eudromias, Boie; (Morinellus, Gesn.)

Example, *Charadrius Morinellus*, Linn.; *Eudromias Morinella*, Boie; *Eudromias Morinella montana et stolida*, Brehm, according to Temm.

Description.—(*Winter Plumage.*)—Top of the head and occiput blackish-ash; large eyebrows of reddish-white uniting on the occiput; face white, dotted with black; upper parts blackish-ash tinged with greenish, all the feathers of those parts framed as it were with ruddy colour; breast and sides reddish-ash; the large patch on the breast and the middle of the belly pure white; shaft of the first quill white, except towards the end, tail terminated with white; bill black; iris brown; feet greenish-ash. Length more than 8 inches.



Charadrius Pluvialis, Golden Plover.
a, Summer dress; *b*. Winter dress.

The *young* have the tints more ashy; top of the head reddish or rusty, varied with longitudinal spots; the ruddy colour which frames as it were the feathers of the upper parts less vivid; tail terminated with bright ruddy.

Summer or nuptial plumage.—Very old Male.—Face and eyebrows very pure white; summit of the head and occiput blackish; nape and sides of the neck ashy; feathers of the mantle and wings bordered with very deep ruddy; on the breast a narrow brown band, succeeded by a large white cincture; part below the breast and sides very bright ruddy; middle of the belly deep black; abdomen reddish-white.

Female.—Ruddy colour of the sides often clouded with ash-colour; black spot of the middle of the belly less apparent than in the male or varied with white feathers.

N.B.—During the moult the plumage varies considerably in different individuals. (Temm.)

This is the *Pluvier Guignard* and *Pluvier solitaire* of the French; *Piviere de corrione* and *Piviere tortolino* of the Italians; *Der Dumme Regenpfeifer* of the Germans; *Dotterel*, *Dotterell*, and *Dottrell* of the modern British, and *Huttan* of the antient British.

Habits, Food, Reproduction, &c.—Drayton sings, of this bird—

> The Dotterell, which we think a very dainty dish,
> Whose taking makes such sport as man no more can wish;
> For as you creepe, or cowre, or lye, or stoupe, or goe,
> So marking you (with care) the apish bird doth doe,
> And acting everything, doth never mark the net,
> Till he be in the snare which men for him have set.'

Poets have a right to a little licence, and in many of the older prose writers a similar account of the silly mimicry of the bird is given. 'The Dotterel,' says Mr. Selby, 'has always been considered a stupid bird, but for what reason I cannot conceive. I allow that, on its first arrival, it shows but little fear of man, but this, I apprehend, arises more from inexperience of persecution in its native wilds, than from any other cause, and which appears evident from the birds, when harassed and repeatedly fired at, soon becoming too cautious to admit of near approach any longer. Their habits also contribute to render them unwary, for being nocturnal feeders (like many others of the *Charadriadæ*), they are at rest and asleep during the greater part of the day, in which state also the *Golden Plover* (a wary bird when roused) will frequently admit of a close approach. As to the story of the Dotterel mimicking the actions of the fowler, by stretching out its leg, wing, or head, when he sets the example, it, without doubt, arose from the motions that they as well as other birds usually and most naturally make when roused from a state of repose; and which every one who attends to the habits of the feathered race must (in flocks of gulls, plovers, tringas, &c.) have frequently observed.' The food consists principally of insects, slugs, and worms. For a long time it was doubted whether the Dotterel bred in this country, but these doubts are now removed, as the reader will find in the next paragraph. The rude nest is formed of lichens or moss, and the three or four lustreless olive-coloured eggs are sprinkled with large dots and numerous spots of deep brown-olive.

Geographical Distribution.—Mr. Selby notices the Dotterel as particularly abundant in Northern Asia and the eastern parts of Europe, and as inhabiting Siberia and the vast steppes of Tartary, frequently living in the vicinity of the salt lakes and marshes of that open region. He adds, that it is also found, during its winter migration, in Italy and Spain, and that the great body of these birds retires to the high latitudes of Northern Asia, Russia, and Lapland Alps to breed; but the flocks which pass along the eastern coast of our island are supposed to limit their flight to the upland districts and mountains of Sweden and Norway. Temminck states that it breeds in the north of Russia. Also in Norway on the great bare plateaux of the mountains, and, in no great number, on the high mountains of Bohemia and Silesia, at an elevation of from 4500 to 4800 feet. In this country, Sussex, Hampshire, Wiltshire, Berkshire, Cambridgeshire, Lincolnshire, Derbyshire, Yorkshire, and Northumberland possess it. Dr. Latham states that in the elevated district of Braemar, Aberdeenshire, these birds hatch their young on dry mossy ground near to and on the very summits of the highest parts, sometimes in the tufts of little short heather or moss. The female sits three weeks, and the young appear about the middle of July. Mr. Yarrell exhibited eggs of this bird, belonging to Mr. Heysham of Carlisle, obtained on Skiddaw in the summer of 1835. Several pairs were breeding in the same locality. (*Zool. Proc.* 1836.) Mr. Gould (*Birds of Europe*) says 'the eggs of these birds are so difficult to obtain, that we only know one collector who possesses them. They are one inch eight lines long, by one inch two lines and a half in breadth, light olive-brown blotched and spotted with black: these specimens were procured from the Grampian Hills.'

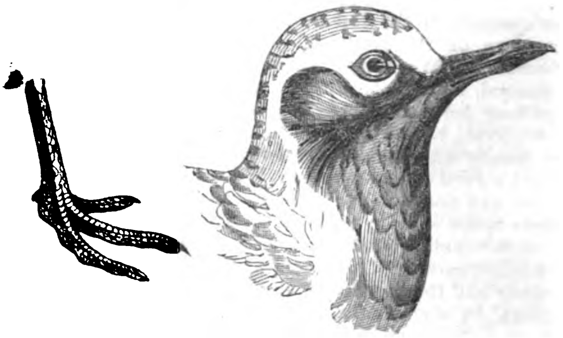
Utility to Man.—Excellent for the table when in season. Numbers are shot near Cambridge and Royston during their spring migration. We find 'Dotrels' charged at one penny each, a considerable sum in those days, in the *Northumberland Household-Book*, and enumerated among the birds admitted to the high (his Lordship's) table. They now find a ready sale in the London market at about six shillings a couple.

Dottrell in nuptial plumage.

That pretty little Plover, *The Ring Dottrell*, comes under the genus *Hiaticula*, Mœhr.

Squatarola. (Cuv.)

Generic Character.—*Bill* rather strong, cylindrical, straight, nearly as long as the head; the tip or horny part, about half the length of the whole bill, tumid and arched with the *tomia* bending inwards. *Nasal groove* wide, half the length of the bill. *Mesorhinium* depressed below the level of the tip. *Nostrils* longitudinally pierced in the membrane of the groove, linear, oblong. *Wings* rather long, acuminate, with the first quill-feather the longest. *Legs* slender, of mean length, naked above the tarsal joint. *Feet* four-toed, three before and one behind; front toes joined at their base by a membrane, that portion of it between the outer and middle toe being the longest; hind toe very small or rudimental. *Tarsi* reticulated. Plumage thick, close, and adpressed. (Gould.)



Head and Foot of Squatarola.

Example, *Squatarola cinerea* (*Tringa Squatarola*, Linn.), the *Bastard* or *Grey Plover*.

Description.—*Adult Male and Female, winter plumage.*—Front, throat, middle of the belly, thigh, abdomen, and upper coverts of the tail pure white; space above the eye, front of the neck, sides of the breast and sides white varied with brown and ashy spots; upper parts blackish-brown, variegated with greenish-yellow spots, but the whole of the feathers terminated with ash-colour and whitish; long internal feathers of the wings deep black; lower coverts of the tail marked on their external barbs with small diagonal brown bands; tail white but reddish towards the end, striped with brown bands, which are pale and few, and placed on the lateral feathers; bill black; iris blackish; feet ashy-black. Length rather more than 10 inches.

Adult Male and Female, in their spring or nuptial plumage.—Space between the eye and the bill, throat, sides and front of the neck, middle of the breast, belly, and sides deep black; front, a large band above the eyes, lateral parts of the neck, side of the breast, thighs, and abdomen pure white; nape variegated with brown, black, and white; occiput, back, scapulars, and coverts of the wings deep black; all the feathers of these parts terminated by a large space of pure white; large white spots on the greatest of the wing-coverts and on the scapulars; oblique black bands on the lower tail-coverts; feathers of the middle of the tail striped with white and black.

The Young before the moult resemble more or less the adult birds and the young in winter; the front, space above the eye, sides of the neck, and sides are variegated with larger but paler spots; upper parts of a bright grey tint varied with whitish; also a little whitish at the extremity of the quills; transverse bands of the tail grey. (Temm.)

In the first of these states of plumage the bird is the *Tringa Squatarola*, Gmel.; *Le Vanneau Varié*, Buff.; and *Grey Sandpiper*, Lath. (*Syn.*)

In the second it is the *Vanellus melanogaster*, Bechst.; *Tringa Helvetica*, Gmel.; *Charadrius apricarius*, Wils.; *Le Vanneau Suisse*, Buff.; *Swiss Sandpiper*, Lath.; and *Schwarzbauchiger Kiebiz*, Meyer.

The young before the moult are *Tringa Squatarola, var.*, Gmel.; *Le Vanneau Pluvier*, and *Vanneau Gris*, Buff.; *Grey Sandpiper*, Lath.; and *Schwarzbauchiger Kiebiz, im Herbstkleide*, Meyer.

M. Temminck, who gives these synonyms, remarks, in his 'Manuel,' that at the two epochs of the moult, individuals are found which have the deep black of the lower parts sprinkled with some white feathers, or, when the white predominates, it is variegated with some black feathers. The birds in winter plumage and the young may, he observes, be easily distinguished from those of the *Golden Plover*, first, by the presence of the posterior toe; and, secondly, by the long black feathers which are found inside of the wings near the body; the rest of the plumage differs so little at these epochs, that one might be easily mistaken.

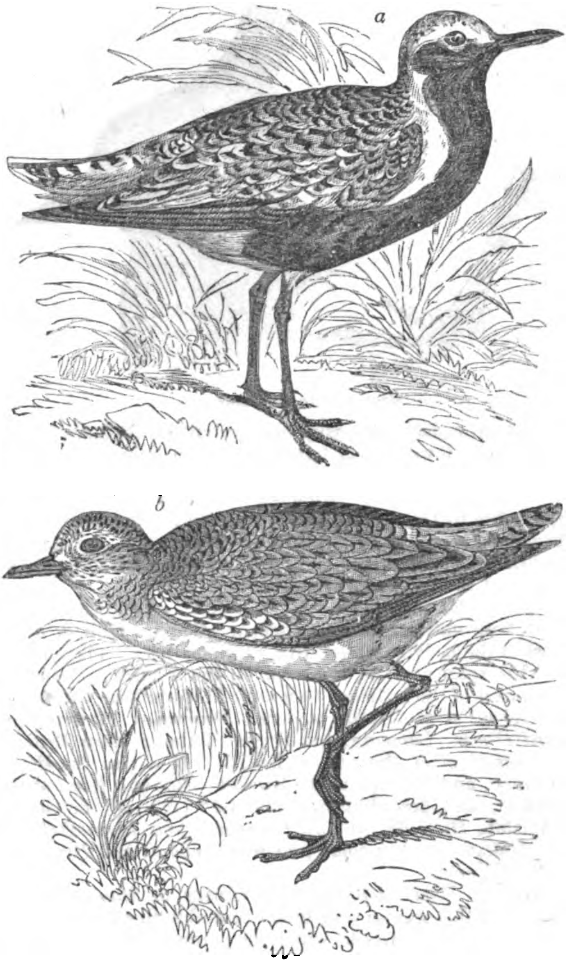
This species is the *Charadrius hypomelas* of Wagler, and the *Grey Squatarole* of Shaw. It appears to be the *Pluvier Gris* of Belon, and in the 'Portraits d'Oyseaux,' &c., is the following loyal quatrain under the figure of the bird:—

> 'De nuict seulet, de jour en compagnie,
> Va le Pluvier suyvant son appelleur.
> Par la voit-on, que c'est bien le meilleur,
> Qu'une gent soit par un Roy gouvernée.'

M. Temminck, who, in the fourth part of his 'Manuel' (1840), protests against the generic separation of this form, not without a passing but sweeping censure on 'toutes les autres coupes nouvelles,' adds to the synonyms *Squatarola varia et Helvetica*, Brehm.; *Kiebiz Regenpfeifer*, Naum.; *Pivieressa*, Savi; and *Sprackling Vipa*, Nils.

Habits, Reproduction, &c.—In Britain, where it is not numerous, and principally known as a migratory species, it is found on the coast 'in oozy bays, or at the mouths of rivers,' where it feeds upon worms, marine crustaceans, &c. The bird runs well, and its whistle is like that of the Golden Plover, but not so shrill. If killed in good season it is delicious for the table. The nest is of the most rude construction. A shallow depression in the earth is lined with a few pieces of dried bents or straw, and there four eggs generally, which are oil-green blotched with black, are deposited. According to Wilson and Nuttall, this Plover has often in the temperate parts of the United States two broods in a season, though it has only one in Massachusetts, where their nests are of rare occurrence. During the summer both young and old feed much upon various kinds of berries, particularly those of the early bramble, called dew-berries, and their flesh is then highly esteemed. About the last week in August they repair with their young to the borders of the sea-coast, where they assemble in great numbers, feeding on small shell-fish, shrimps, and other small marine animals. Grasshoppers and other insects that abound in the fields are also eaten by them. 'They are,' says Nuttall, 'extremely shy and watchful, uttering a loud rather plaintive whistling note as they fly high and circling in the air, and are so often noisy, particularly in the breeding season, as to have acquired among many of the gunners along the coast the name of the *Black-Bellied Killdeer*. They usually linger round the sea-coast in the Middle States till the commencement of November, when the frosts beginning sensibly to diminish their prospect of subsistence, they instinctively move off towards the south, proceeding probably at this time under the shade of twilight, as moving flocks are nowhere, as far as I can learn, seen by day. About the middle of September, in the marshes of Chelsea (Mass.) contiguous to the beach, they sometimes assemble at day-break in flocks of more than a thousand individuals together, and soon after disperse themselves in companies on the shores, to feed upon the small shell-fish and marine insects (crustacea). This crowding instinct takes place a short time previous to their general migration southward.' (*Manual of the Ornithology of the United States and Canada.*)

Geographical Distribution.—All the temperate countries of Europe. More abundant in France than in Germany; rare in Switzerland; common enough in the islands and on the coasts of Holland. Abundant in summer in the regions of the Arctic Circle and of Oriental climates, where it breeds. M. Cantraine killed a young one in the Strait of Boniface. (Temm.) Dr. von Siebold and M. Bürger saw it in Japan, and M. Temminck states that he has seen individuals from that locality in both summer and winter plumage. Dr. Richardson, who notices it as the *Toolee-areeoo*, or *Tooglee-aiah* of the Esquimaux, says that it is observed in the fur countries in similar places to those frequented by the Golden Plover, though it is not equally common, and that it breeds in open grounds from Pennsylvania to the northern extremity of the continent. He describes a specimen, killed at Hudson's Bay, lat. 57°, in August, 1822. Captain James Ross, in the Appendix to Sir John Ross's *Last Voyage*, observes that it was more rarely met with than the Golden Plover, but was found breeding near the margins of the marshes immediately to the south-west of Fury Point, in considerable numbers. Some specimens were also obtained near Felix Harbour. It is met with in Egypt and upon the confines of Asia, in Siberia, &c. (Selby.) The last-quoted author states that in Northumberland there are a few stations on the coast of Britain, where it is found during the whole winter, but only in families or small flocks. It generally arrives about the middle of September, sometimes even earlier, he adds, at which time several of the old birds still retain a part of their summer plumage. In the month of May they go northward. Mr. Gould says that they appear in the greatest abundance in this country while performing their periodical migrations in the months of April and May along the coasts of Lincolnshire, Norfolk, Suffolk, Essex, and Kent. (*Birds of Europe.*)



Squatarola cinerea—Grey Plover, or Grey Lapwing.
a, spring plumage; *b*, winter plumage.

Vanellus. (Briss.)

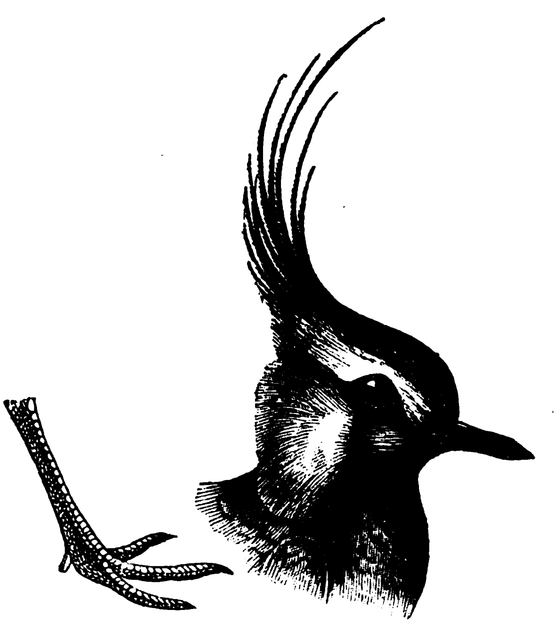
Generic Character.—*Bill* shorter than the head, straight, slightly compressed, the points of both mandibles horny and hard. *Nasal groove* wide, and reaching as far as the horny tip. *Nostrils* basal, linear, pierced in the membrane of the nasal groove. *Legs* slender, with the lower part of the tibiæ naked. *Feet* four-toed; three before and one behind, united at the base by a membrane; hind toe very short, articulated upon the tarsus. *Tarsi* reticulated. *Wings* ample, tuberculated, or spurred. The first three *quill-feathers* notched or suddenly narrowed towards their tips, and shorter than the fourth and fifth, which are the longest. (Gould.)

Example, *Vanellus cristatus*; *Tringa Vanellus*, Linn.

Description.—*Male in winter plumage.*—Occipital feathers very long, loose barbed, and curved upwards. Top of the head, crest, front of the neck and breast glossy black; upper parts deep green with brilliant reflections; sides of the neck, belly, abdomen, and base of the tail pure white; tail feathers terminated by a large black space, with the exception of the external feather; lower coverts ruddy, bill blackish; feet red-brown. Length rather more than twelve inches.

The *female* has the black of the throat and breast less deep.

The *young before the moult* have the occipital crest shorter; some blackish colour below the eyes; the throat



Head and foot of Vanellus.

varied with black and ashy brown; all the feathers of the upper and lower parts terminated with ochreous yellow; feet ashy-olive.

Spring or nuptial plumage.—This is scarcely distinguishable by the greater brilliancy of the reflections on the back and wings, and by the deeper intensity of the black of the throat and breast. The crest however is longer, and the colour of the feet bright reddish.

Accidental Varieties.—Pure white. Yellowish white with faint indications of the deeper colours. One or other part of the body speckled with white feathers. (Temm.)

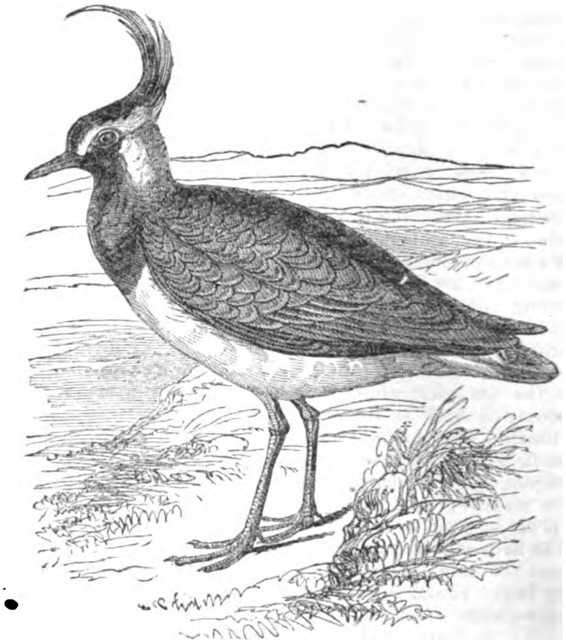
This species is *Le Vanneau* of the French; *Paoncella commune* of the Italians; *Gehaübte Kiebiz* of the Germans; *De Kievit* of the Netherlanders; *Peaseweep*, *Peewit*, *Bastard Plover*, *Lapwing*, and *Wype* of the modern British; *Cornchwigel* of the antient British. It is also the *Wipa*, *Kowipa*, and *Blæcka* of the Swedes; *Vibe* and *Kivit* of the Danes; and, according to Belon, Αἴξ[*] (Aix) of the Greeks (Aristot., *Hist. An.*, viii. 3), *Pavonzino* and *Parruchello* of the Italians; and in some provinces *Dixhuit* and *Pupechieu* of the French.

Habits, Food, Reproduction, Utility to Man, &c.—The habits of this species very much resemble those of the other Plovers, and the arts by which the parents try to lead either dog or man from their eggs or young by counterfeiting the gait of a wounded bird, &c., are as well if not better known as the stratagems of its congeners on the like occasions. This is the bird which furnishes the Plover's eggs of the London market; and those who rob the nest are, it is said, careful not to take all, but they leave one or two, so as to induce the bird to go on laying, which she generally does to make up her number. The full compliment, when the bird is not robbed, is generally four, and they are olive-coloured, spotted and blotched with black. That part of the egg which is usually called the white (the albumen) is transparent when boiled, and has somewhat of a bluish tinge. The nest, if nest it may be called, is the bare earth. It haunts the borders of rivers, lakes, plains, and marshy places, and is generally to be found near the sea-shore in the winter. This part of its habits well agrees with those described as proper to Aristotle's *Aix*, according to the reading given by Belon[†] (*loc. cit.*). This elegant bird seems to have been as much esteemed by the French for the table as by our own countrymen. In the 'Portraits des Oyseaux,' the following quatrain appears under the figure of the bird:—

> 'Voy cy dessus le portraict du Vaneau,
> Et le voyant, pourras ta veue paistre:
> Mais si tu veulx d'un bon morceau repaistre
> Il y a peu de meilleurs oyseaux d'eau.'

In the 'Northumberland Household-Book,' 'Wypes' are charged at one penny each, and they are among the birds admitted to his lordship's own 'mees.'

Geographical Distribution.—Spread over the whole of Europe, and particularly plentiful in Holland. Mr. Gould states that he has seen specimens in collections from India and Africa. It is noted by Messrs. Dixon and Ross as occurring in great numbers near Erzeroom, arriving at the end of March, and departing at the end of November, During the summer it frequents the river (*Karah-soo*, or northern branch of the Euphrates), but on its arrival, and previous to its departure, it is found in moist fields. The native name is *Kiz-Cooshóo* (Maiden's Bird), or *Kahmaum Cooshóo* (Bath-bird). *Vanellus Keptuschka*, and *Charadrii Morinellus* and *minor* were found by those gentlemen at the same locality. (*Zool. Proc.*, 1839.) It appears in the 'List of Birds' seen in Japan, by Dr. von Siebold and M. Bürger; and Temminck states that individuals from that locality differ in nothing from those of Europe.



Vanellus cristatus.

This species is confined to the Old World; but Capt. P. P. King, R.N., has described a second species from the Straits of Magalhaens. It is figured in the 'Illustrations of Ornithology,' under the name of *Squatarola cincta.*

Philomachus, Mœhr; (Hoplopterus, Bonap.)

Example, *Philomachus spinosus*, *Charadrius spinosus*, Linn.; *Pluvialis Senegalensis armata*, Briss.; *Pluvianus spinosus*, Gould.

Description.—Male and Female in perfect plumage.—All the summit of the head and occiput, throat, front of the neck, breast, sides, quills, and three-fourths of the tail black; region below the eyes, lateral base of the bill, sides of the neck, nape, long feathers on the sides, inside of the wings, the whole border of the wing, thighs, abdomen, rump, and first fourth of the origin of the tail pure white; the whole of the mantle, quills nearest the body, as well as all the coverts, grey-brown, more or less deep or umber-colour; two lateral feathers of the tail terminated with white. Length ten to eleven inches.

This is *Le Pluvier à aigrette*, *Le Pluvier huppé de Perse*, and the *Pluvier armé du Senegal* of Buffon; *Spur-winged and Black-breasted Indian Plover* of Latham.

Habits, &c.—Little or nothing is known of the habits of this species, with the exception of what we learn from Dr. Latham, who says that it inhabits Russia, and is frequent near Aleppo, about the river Coie. 'The Spur-winged Plovers,' says he, 'are very numerous and exceedingly noisy, have a hasty and continual movement of the head and neck, drawing them up briskly, and then stretching them quickly forward, almost as if they were making hasty and eager bows.'

Geographical Distribution.—M. Temminck gives Egypt and Senegal as the *habitat*, and says that it shows itself accidentally in Italy, but is said to be more common in the islands of the Archipelago. In Greece, he adds, a great number is found; and Professor Nordmann killed one in Russia.

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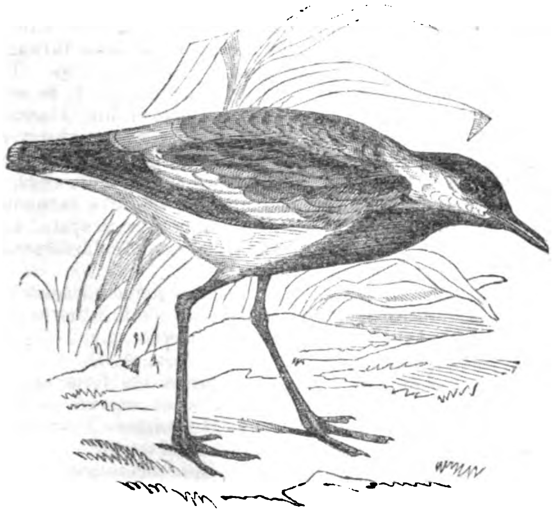
[*] Quære tamen.

[†] But according to other readings it is the αλιαίετος, or Sea-eagle, to which these habits are ascribed.



Philomachus Spinosus.

Himantopus. (Briss.)

Generic Character.—Bill long, slender, cylindrical, flattened at its base and compressed at the point; both mandibles channelled to the extent of half their length from the base. *Nostrils* lateral, linear. *Tarsi* very long and slender. *Toes* three before, the external and middle toe united by a membrane; nails small and flat. *Wings* very long, the first *quill-feather* the longest. (Gould.)

Example, *Himantopus melanopterus; Himantopus rufipes*, Bechst.; *Charadrius Himantopus*, Linn.

Description.—Face, neck, and all the lower parts pure white, assuming a rosy tint on the breast and belly; occiput and nape black or blackish, with white spots; back and wings black, glossed with green; tail ash-colour; bill black; iris crimson; feet vermillion. Length from the point of the bill to the extremity of the tail about fourteen inches, and to the claws about nineteen inches.

The very old male has the nape, and even, sometimes, the occiput, quite white.

The *female* is less than the male; the black of the mantle and wings has no greenish reflexions; and her general tint is browner.

The feet of the *young* are orange; their mantle and wings brown, with whitish edges; feathers of the upper part of the head, occiput, and nape blackish-ash with whitish borders. (*Himantopus Mexicanus*, Briss.) (Temm.)

This is *L'E'chasse* and *E'chasse à manteau noir* of the French; *Cavaliere grande Italiano* and *Cavaliere d'Italia* of the Italians; *Schwarzflügelige Strandreuter* of the Germans; the *Stilt Plover, Long-legged Plover*, and *Longshanks* of the modern British; *Cwttyn hîrgoes* of the antient British.

It is the *Hyperbates Himantopus* of Naumann, and *Himantopus longipes* of Brehm.

Habits, Reproduction, Geographical Distribution, &c.—In tracing the history of this curious form, we must first notice Belon, who, in the 'Portraits d'Oyseaux,' superscribes a by no means bad figure with the following synonyms:—'Grec. Ἱμαντόπους; Italien, Merlo aquaiolo grande; François, Lon pourroit dire, le grand chevalier d'Italie.' Beneath the cut he informs us that the *Himantopus*, like the *Hæmatopus*, has only three toes, but that one is a river and the other a sea bird, and that the former is often seen in all the countries along the river which passes by Castel Durante in the duchy of Urbino. It is there called, he says, *Merlo aquaiolo grande*, in contradistinction to another bird which is simply called *Merlo aquaiolo* (our Water-ouzel, Cinclus?). There is no bird, says Belon, in continuation, which has such long legs with reference to the size of its body; for, having the body of a pigeon, its red legs are a cubit long. After a brief description, he gives the following apotheosis:—'Lon en a mangé à la table de monseigneur le cardinal de Tournon, lors qu'il faisoit sejour en la duché d'Urbin.'

White, in a letter to Pennant, notices the advent of six of these birds to the neighbourhood of his favourite Selborne in his usual charming style.

'In the last week of last month (April, 1779), five of these most rare birds, too uncommon to have obtained an English name, but known to naturalists by the terms of *Himantopus, Loripes*, and *Charadrius Himantopus*, were shot upon the verge of Frinsham-pond, a large lake belonging to the bishop of Winchester, and lying between Wolmer Forest and the town of Farnham in the county of Surrey. The pond-keeper says there were three brace in the flock; but that after he had satisfied his curiosity, he suffered the sixth to remain unmolested. One of these specimens I procured, and found the length of the legs to be so extraordinary, that, at first sight, one might have supposed the shanks had been fastened on to impose on the credulity of the beholder: they were legs in *caricatura;* and had we seen such proportions on a Chinese or Japan screen, we should have made large allowance for the fancy of the draughtsman. These birds are of the *plover* family, and might with propriety be called *stilt plovers.* Brisson, under that idea, gives them the appropriate name of l'échasse. My specimen, when drawn and stuffed with pepper, weighed only four ounces and a quarter, though the naked part of the thigh measured three inches and a half. Hence we may safely assert that these birds exhibit, weight for inches, incomparably the greatest length of legs of any known bird. The *flamingo*, for instance, is one of the most long-legged birds, and yet it bears no manner of proportion to the *himantopus;* for a cock *flamingo* weighs at an average about four pounds avoirdupois; and his legs and thighs measure usually about twenty inches. But four pounds are fifteen times and a fraction more than four ounces and one-quarter; and if four ounces and a quarter have eight inches of legs, four pounds must have one hundred and twenty inches and a fraction of legs, *viz.* somewhat more than ten feet, such a monstrous proportion as the world never saw! If you should try the experiment in still larger birds, the disparity would still increase. It must be matter of great curiosity to see the *Stilt Plover* move; to observe how it can wield such a length of lever with such feeble muscles as the thighs seem to be furnished with. At best one should expect it to be but a bad walker; but what adds to the wonder is, that it has no back toe. Now without that steady prop to support its steps, it must be liable in speculation to perpetual vacillations, and seldom able to preserve the true centre of gravity. The old name of *Himantopus* is taken from Pliny; and, by an awkward metaphor, implies that the legs are as slender and pliant as if cut out of a thong of leather. Neither Willughby nor Ray, in all their curious researches, either at home or abroad, ever saw this bird. Mr. Pennant never met with it in all Great Britain, but observed it often in the cabinets of the curious at Paris. Hasselquist says that it migrates to Egypt in the autumn; and a most accurate observer of nature has assured me that he has found it on the banks of the streams in Andalusia. Our writers record it to have been found only twice in Great Britain From all these relations it plainly appears that these long-legged plovers are birds of South Europe, and rarely visit our island; and when they do, are wanderers and stragglers, and impelled to make so distant and northern an excursion from motives and accidents for which we are not able to account. One thing may fairly be deduced, that these birds come over to us from the Continent, since nobody can suppose that a species not noticed once in an age, and of such a remarkable make, can constantly breed unobserved in this kingdom.'

The passage in Pliny from which the name *Himantopus* is taken must be, we presume, that in the eighth chapter of the fifth book on the *Æthiopes:* 'Himantopodes loripedes quidam, quibus serpendo ingredi natura est.'

Pennant says, 'These birds are extremely rare in these islands. Sir Robert Sibbald records a brace that were shot in Scotland; another was shot a few years ago at Stanton-Harcourt Common near Oxford; and we have seen them often in the cabinets of the curious at Paris, taken on the French coasts.'

Mr. Selby observes that the members of this genus, remarkable for the disproportionate length and the slenderness of their legs, are not numerous, but possess a very wide geographical range, some one of the species being found in every quarter of the globe. By the earlier authors, when only one species was recognised, it was, he remarks, placed among the typical Plovers. Its affinity to the Plovers is shown, he adds, in the form of its feet, and the passage to the genus *Charadrius* is effected through the interposition of some of the longer-limbed species, and by the members of the genus *Pluvianus*. It also connects, he thinks, the Plovers with certain groups of the *Scolopacidæ*, as it shows an evident affinity, both in form and manners, to the Avosets (*Recurvirostra*), amongst which Wilson was led to place the North American species, from the great similarity observed by him in their respective habits. Mr. Selby states that the species before us inhabits the shores of the ocean, as well as of interior saline and fresh-water lakes, feeding upon worms, insects, larvæ, &c., which are obtained in the muddy shallows of the waters they frequent. Mr. Selby further remarks that their moult is presumed by Temminck to be double, for the fact does not appear to be established by actual observation. (*Illustrations of British Ornithology*.)

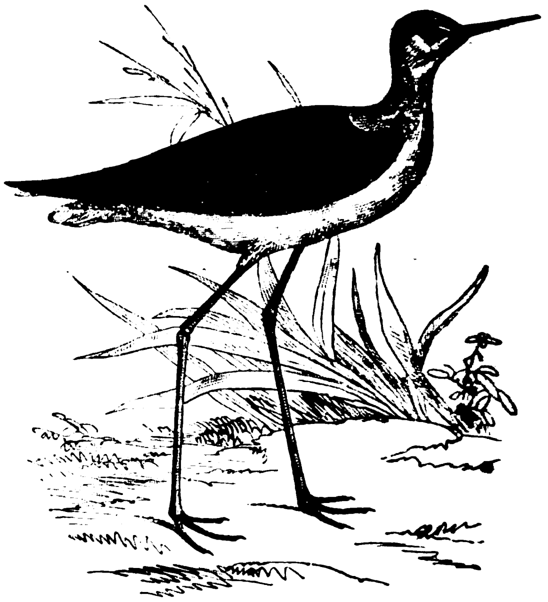
Mr. Gould (*Birds of Europe*) states that the genus *Himantopus*, although widely distributed, contains, he believes, only two well authenticated species, namely, *Him. melanogaster* and the North American species. 'This bird,' says Mr. Gould, in continuation, 'so singular in its appearance from the extraordinary length and slenderness of its legs, has been often killed in England; but it must be classed among those birds whose visits are accidental and uncertain. It is equally scarce in Holland and the northern portion of Europe; in fact, though apparently abundant nowhere, it exhibits so wide a range, that its deficiency in point of number in any given locality is counterbalanced by its almost universal distribution. We have been presented with skins, which we consider to belong to this same species, from Africa, India, the islands of the Indian Archipelago, and, if we mistake not, from North and South America. The Long-legged Plover, as its conformation would lead us to conclude, is a bird whose most congenial habitat is morasses and the low flat shores of lakes, rivers, and seas. Hence in the eastern portions of Europe, where it is said to arrive from Asia in small flocks, it takes up its abode along the lakes and among the vast morasses of Hungary and Russia, where, according to M. Temminck, it rears its progeny, and where it fearlessly wades in search of its food, without much chance of being carried out of its depth; but should such an occurrence happen, or the waves drift it out from the shore, it possesses, like many of the true Wading Birds, the power of swimming with the greatest ease and lightness: in fact, in whatever point of view we consider the Long-legged Plover, we find it adapted in the best possible manner for its habits and modes of life. Few birds exceed it in the powers of flight; its wings far exceed the tail, and it passes through the air with astonishing rapidity. When on firm ground, it appears as if tottering on long and awkward stilts, but firm ground is not its congenial habitat. The egg, as figured by Dr. Thienemann, measures one inch nine lines in length by one inch three lines in breadth, of a pale bluish-green, spotted and specked with dark brown.'

The species is recorded in the catalogue of birds collected on the Ganges between Calcutta and Benares, and in the Vindhyian hills between the latter place and Gurrah Mundela on the Nerbuddah, by Major James Franklin, F.R.S. (*Zool. Proc.*, 1830-31.) Lieutenant-Colonel Sykes notes it in his 'Dukhun' list with the following observations:—'There are slight discrepancies in the plumage between the birds of Java, India, and Europe; and in case of these being permanent and not the result of nonage, specific differences might be established. *Irides* narrow, lake or crimson colour. Length, inclusive of tail, 16 inches; tail 3¼ inches; to the end of the toes, 22½ inches. Gregarious. Vegetable matters, larvæ of water insects, and minute univalve shells found in the stomach. These birds are strangely polluted with visceral worms of the tape and capillary kinds.' (*Zool. Proc.*, 1832.) Mr. Thompson, in his 'Catalogue of Irish Birds,' records that, in the winter of 1823, a bird of this species was seen by Mr. Ball in the neighbourhood of Youghal. (*Zool. Proc.*, 1834.) Messrs. Dickson and Ross saw it near Erzeroom at the end of July. It was not very common, and haunted the borders of the river. There was a naked rim round the eye-lid, of a bright vermillion colour. (*Zool. Proc.*, 1839.) It has also been noticed at Trebizond by Mr. Keith Abbott. (*Zool. Proc.*) Colonel Sykes, in his observations on Captain Spiller's collection of birds formed at the Cape of Good Hope, notices *Himantopus melanopterus* as universal. M. Temminck states that individuals killed in Egypt do not differ from the European specimens; neither do those brought from Brazil by the Prince de Wied. The only difference is, that the Egyptian and Brazilian birds are larger. American specimens, also received by M. Temminck, differed in nothing from those in Europe, and he adds that it is asserted that the species is the same throughout India, but he has had no means of verifying this. The Long-legged Plover figured by Wilson (pl. 58, f. 2) he considers distinct and new. In the last part of his 'Manual' (1840) he states that the Japanese specimens exhibit no difference, and that the bird makes its nest upon a little eminence constructed in the marshes, laying four eggs, of the size and form of those of the Avoset, of a tarnished green colour, marked with numerous ashy spots, and dotted with moderate-sized and very small reddish-brown spots.

Mr. Gould considers that the species found in Australia and the islands of Java and Sumatra, though hitherto confounded with *Him. melanogaster*, is different, and he names it *Himantopus leucocephalus*. (*Zool. Proc.*, 1837.)

The Prince of Musignano, who places the form among the *Recurvirostridæ*, makes *Himantopus nigricollis* (*Recurvirostra Himantopus*, Wils.) and *Himantopus Mexicanus*, Briss., from the northern and central and southern parts of America respectively, distinct from *Him. melanogaster*.

Mr. Swainson informs us that, in his opinion, the species from Western Africa, although confounded by most naturalists with *Him. melanogaster*, is certainly different, being characterised by greater size, greater length of wing, and a peculiar grey colour on the head and neck, which is not found in either European or American species.



Himantopus melanogaster.

The Pratincole (*Glareola*), the Sea Pie (*Hæmatopus*), and the Turnstone (*Strepsilas*), will be treated of under their respective titles.

PLOWDEN, EDMUND, serjeant-at-law, was an eminent lawyer, who flourished in the reign of Mary and the early part of that of Elizabeth. He was the representative of an antient family, Plowden of Plowden in Shropshire. He was born about the year 1517, and after having in early life studied medicine and surgery, first at Cambridge, and afterwards at Oxford, is said by Anthony Wood to have changed the course of his studies to the common law when he was thirty-five years of age. But this statement is totally at variance with Plowden's own account of himself, for he says, in the preface to his 'Commentaries,' that he entered on the study of the law in the twentieth year of his age, and in the thirtieth of the reign of King Henry VIII. (Preface to his *Comm.*, which is well worth reading.) He was twice a reader of the Middle Temple, and about the close of the reign of Mary was called to the degree of serjeant-at-law; but he was omitted in the call of serjeants in the 2 Elizabeth, possibly because, as is suggested in a note to Wood's account of him, he was an 'unalterable papist.' He died in 1584, and was buried in the Temple Church, where a monument to his memory still remains. Camden says of him (*Annal. Reg. Eliz.*, an. 1584), 'ut in juris Anglici scientiâ, de quâ scriptis benè meruit, facilè primus, ita vitæ integritate inter homines suæ professionis, nulli secundus.' His devotion to legal studies was so great, that there is a professional tradition that 'in three years, he went not once out of the Temple.' (Wood's *Athenæ*, vol. i., p. 504, note.)

The high reputation of Plowden in the legal profession rests entirely upon the character of his Reports or Commentaries. This work consists of a collection of the Reports of important cases, executed with great fidelity and care, and extending from the reign of Edward VI. to the middle of the reign of Elizabeth. The first complete edition of Plowden's 'Commentaries' is in black-letter and Norman French, fol., 1684; the second edition, likewise in folio, is translated into English, fol., 1761. There is also an octavo reprint of the 'Commentaries,' London, 2 vols., 1816. (Wood's *Athenæ Oxonienses;* Burke's *History of the Commoners of England*, vol. iii., p. 251.)

PLUM. The *Prunus domestica* is generally considered as the species which has given rise to the numerous varieties of this fruit; but both *Prunus insititia* and *P. spinosa* have most probably contributed. These species are indigenous to a great portion of the northern hemisphere, Britain included. Their range may be stated to extend from Norway to Barbary, and from Portugal to Cashmere, and even Nepaul. Damascus was formerly celebrated for this fruit: branches of the plum are represented on Damascus medals; and many of the varieties now in cultivation still retain the name of this place, or it is employed as a distinguishing prefix to a number of subvarieties; thus the French enumerate upwards of twenty varieties of *Damas*. In this country the name of *Damascene* was given to those varieties which may be supposed to have been brought from Damascus, or to others similar; but the corruption of this to *Damson* has been long established. Whatever region may be the origin of them, it is certainly to France that we are indebted more immediately for the greater part of the varieties now actually cultivated.

In the 'Catalogue of Fruits,' published by the Horticultural Society, 274 varieties are named. It is not however to be presumed that all these will prove distinct, but upwards of 200 at least may be reckoned as such. A selection of the best of these may prove useful; and as some means of ascertaining whether they are correctly named by the nurserymen who sell them, the following simple mode of arrangement will be found useful:—

Class I.

* FRUIT PURPLE.
  a. *Round.*
    Shoots smooth. § 1.
    Shoots downy. § 2.
  b. *Oblong.*
    Shoots smooth. § 3.
    Shoots downy. § 4.

Class II.

** FRUIT PALE.
  a. *Round.*
    Shoots smooth. § 5.
    Shoots downy. § 6.
  b. *Oblong.*
    Shoots smooth. § 7
    Shoots downy. § 8.

Varieties of plums most deserving of cultivation, arranged according to the preceding classification, are the following:—

§ 1.
Reine Claude Violette, or purple gage.
Nectarine plum
Kirke's.
Virgin.
Queen-mother.

§ 2.
Royale Hâtive.
Orleans.
Early Orleans.
Coe's Fine Late Red.
Wine-sour.

§ 3.
Blue Imperatrice.
Ickworth Imperatrice.
Cooper's Large Red.

§ 4.
Blue Perdrigon.
Shropshire Damson.

§ 5.
Green Gage.
Knight's Large Green Drying.
Lucombe's Nonsuch.

§ 6.
Drap d'Or.
Mirabelle.
Washington.

§ 7.
Coe's Golden Drop.
St. Catherine.
White Magnum Bonum.

§ 8.
Gumaraen.
White Perdrigon.

The cultivation of the plum is not difficult. The tree is hardier than the cherry-tree, at least than that producing the Bigarreau and Heart-cherries; but the blossoms are equally tender. The winter at Riga does not kill the plum-tree, but the cherry-trees just mentioned and many varieties of the pear and apple trees are killed there. The severe frost of January, 1838, contrary to expectation, did not injure the fruiting of the plums in the following summer. The trees succeed in any free soil, not too dry, but by no means stiff or clayey. Their roots extend horizontally, and are apt to throw up suckers, which must be destroyed on their first appearance, otherwise they rob the tree, and form protuberances on the roots. Too much manure will actually kill the trees; and at all times a medium state of vigour should be aimed at. Excessive luxuriance is the forerunner of gummy exudations; and, on the other hand, if the tree be stunted and the vessels contracted by drought or other causes, whereby the sap is obstructed, gum is in that case also induced. Pruning should be applied to the plum in the same manner as to the peach; and in the management of standards care should be taken to destroy useless limbs on their first appearance, instead of waiting till the shoots to be removed become large branches. The varieties are propagated both by budding and grafting; and for the latter, as the buds push early, the cuttings should be taken off not later than February.

PLUMATELLA, a fresh-water genus of POLYPIARIA DUBIA.

PLUMBA'GIN, a vegetable principle existing in the root of the *Plumbago Europæa*. This substance is of a lemon-yellow colour, and crystallizes in prisms or fine needles of considerable brilliancy. It has a sweetish taste, but leaves an acrid hot impression in the mouth. It melts in a gentle heat, and assumes a crystalline appearance on cooling. When more strongly heated, a small portion sublimes, and the greater part is decomposed, no ammonia being evolved.

Though very slightly soluble in water, the solution has a yellow colour; when dissolved in boiling water, yellow crystals are deposited on its cooling. It is more soluble in alcohol and æther and dilute acids than in water; in the alkalis it is also very soluble, and the solutions are red. The yellow colour is restored by the addition of an acid. When added to a solution of di-acetate of lead, a crimson-red precipitate is gradually formed. Plumbagin does not appear to have been analyzed.

PLUMBAGINA'CEÆ are a small natural order of monopetalous exogens, with a compound superior one-celled one-seeded ovary, the ovule in which is supported upon a long curved funiculus or cord. They are usually plants with a showy flower, herbaceous or under shrubby, with several styles or stigmata, and a powerful acrid or astringent quality. The principal genus of the order is the *Statice*, whose many species, under the name of *Sea Lavenders*, inhabit the salt-marshes or cliffs of all the temperate parts o Europe. The prevailing colour of the flowers is blue; the instances of yellow, or any other colour, being more rare. Garden Thrift, *Armeria vulgaris*, a plant frequently used for an ornamental bordering in flower-gardens, is said to possess powerful diuretic qualities in its petals.

Plumbago capensis.

1, a flower deprived of corolla and stamens; 2, the ovary, and stamens surrounding it; 3, a vertical section of the ovary, showing the peculiar position of the ovule.

PLUMBA'GO—*Graphite, Black Lead.* This substance occurs crystallized and massive. Primary form a rhomboid. Occurs in imbedded hexagonal prisms. Cleavage parallel to the terminal planes of the prism, very distinct, and the laminæ flexible. Fracture granular and uneven. Hardness 1·0 to 2·0. Colour steel or blackish-grey. Streak black, shining. Lustre metallic and glistening. Unctuous to the touch. Opaque. Specific gravity 2·08 to 2·45.

Found in Greenland and in the neighbourhood of Philadelphia in the United States.

Massive varieties occur amorphous, in reniform masses, and irregular nodules. Structure foliated, granular, compact.

Found in various parts of the world. That of Borrowdale in Cumberland is of the best quality for what are called black-lead pencils; while the commoner sorts are used for making melting-pots, for diminishing the friction of machinery, and for protecting iron from rusting. That which is imported from the East Indies is remarkably soft. Plumbago conducts electricity, is infusible, and very difficult of combustion.

Professor Vanuxem has analyzed several varieties of plumbago. No. 1 was a pure specimen from Borrowdale, and No. 2 from Bustletown, Pennsylvania.

	No. 1.	No. 2.
Carbon .	88·37	94·4
Silica .	5·10	2·6
Alumina .	1·00	—
Water .	1·23	0·6
Oxides of iron and manganese .	3·6	1·4
	99·30	99·0

It was at one time supposed that plumbago was a carburet of iron, but, in the opinion of Berzelius, the experiments of Karsten have proved that it is a peculiar form of carbon, and that the substances which it contains are in a state of mixture merely and not of chemical combination.

According to Dr. Thomson, plumbago is found usually in primary or transition rocks. At Borrowdale it occurs in nests in a greenstone rock, which constitutes a bed in clay-slate. In Inverness-shire it occurs in gneiss; at Arendal in Norway, in quartz rock; and in the United States, in felspar and mica-slate, but always in primary rocks.

PLUMBLINE. When a heavy body suspended by a flexible string is at rest, the line passing through the point of suspension and the centre of gravity of the weight is in the direction in which gravity acts. The *horizon* is a plane perpendicular to this line, and the *zenith* is that point of the heavens marked out by the continuation of the line upwards. If the string be *perfectly* flexible, it will coincide with the theoretical line above described.

The application of the plumbline to the arts does not require any explanation here. We shall briefly mention the manner of applying the plumbline to astronomical instruments, and it is necessary to mention it, as in most cases it has been superseded by the spirit level, or observation by reflexion, and so is not described in the account of the instruments.

In the earlier astronomical instruments, where the telescope or line of sight was moveable and the limb of the instrument fixed, two fine dots were made on some part of the instrument, as distant from each other as possible, and parallel to that radius, which was required to be vertical. A fine line was hung in front of the dots, and made to bisect the upper dot by a slow screw motion carrying the wire. The lower dot was then brought under the plumbline by the adjustments of the instrument, and when both were at the same time accurately bisected, the rectification of the instrument in this respect was complete. The weight below was *completely* immersed in water to diminish its oscillations, and the exact bisection of the dots by the wire was inspected by microscopes. The plumbline was brought as close to the dots as was consistent with perfect freedom, and at the same distance from each as nearly as could be judged. It was also protected by a covering from the influence of the wind.

In instruments of this construction, the bisection of the dots by the plumbline should be noted at the same time as the object is observed by the telescope. As the plumbline in its ordinary position was sometimes in the way of the telescope, two other dots were frequently inserted, which, being verified by the principal dots, could be used for the same purpose of verification; and it is evident, that while the framework of the instrument continues unchanged, the verticality of the line passing over the supplementary dots will ensure the verticality of the line passing over the primary dots, since the two lines are parallel. A simple plumbline, as above described, was universally used up to the latter end of the last century for rectifying instruments employed in measuring altitudes, or zenith distances, in which the telescope and its vernier moved on a fixed limb. When the telescope and limb were united, the plumbline was made to pass over the centre of the divisions, and marked out the division which corresponded to the altitude, the fractional part being measured by the screw which moved the whole instrument until the next division was bisected. Instruments of the latter kind were not, we conceive, much known in this country, but we believe they were used in France.

About 1785 (for we can find no exact date) Ramsden introduced a great improvement in the application of the plumbline. The *images* of the dots on the instrument were formed on the plumbline by interposing lenses, and the bisection of the image by the plumbline was viewed through microscopes. The plumbline was thus kept out of the way of the observer, and the optical parallax destroyed. This apparatus was, we believe, called Ramsden's *Ghost.* But the ghost is liable to this objection when applied to circles in which the telescope and limb are fixed and revolve together, and the angles read off by microscopes, viz. that the dots are never visible upon the plumbline at the time of observation, but only before or after, at the moments of adjustment, so that a derangement may take place unnoticed. For circles which do not turn in azimuth, this objection seems incurable (not that it is of much importance, as, from the superior stability of their framing and mounting, transit circles can scarcely be liable to any sudden error), but the present mode of observing by reflexion does away with the use of the plumbline altogether in instruments of this construction. In circles revolving freely in azimuth, the following modification of Ramsden's plumbline, which was introduced by Troughton, is much to be preferred to it.

On considering the mode in which the zenith distance of an object is measured by a circle revolving freely in azimuth, it will be seen that, by combining two observations in reversed positions of the circle, we have the true distance measured from that point in which the axis of rotation when continued cuts the heavens. If the axis is truly vertical, this point is the zenith, and the purpose of Troughton's plumbline is to set the axis truly vertical. An upright tube is attached to the upper part of the instrument, which revolves freely in azimuth, the plumbline hangs in the tube over a notch, the weight below being wholly immersed in water. Near the bottom of the tube, two smaller tubes cross it at right angles to each other and to the principal tube. In each of these smaller tubes is the following apparatus:—at one end a mother-of-pearl disc with a dot, then a lens which forms an image of the dot on the plumbline, and at the other end a microscope to note the bisection. The dot is a little excentric, and the tube has sufficient play to admit of the adjustment being effected very nicely. Now when both the dots have been properly bisected by the plumbline, turn the instrument half round, and look at them again. It is clear that if the axis of rotation were vertical, it would be parallel to the plumbline in both positions, and the dots would be still bisected. If not, by touching the foot-screws, the dots can be brought half way to bisection, and then fully bisected by their own adjustments. When this is done, the axis is truly vertical. The operation must of course be repeated and continued until the dots are bisected by the plumbline in every position of the instrument, when the axis is truly vertical. [CIRCLE.] But though Troughton's plumbline is exceedingly beautiful and accurate, we greatly doubt whether it is so effective as a spirit-level. It is much more troublesome to adjust, there are no means of *measuring* its deflexions (these might be given), it is a longer time in coming to rest, is more liable to cause and to receive injury, and unless the instrument be reversed *after every observation*, it is as likely to vary from temperature as the level. We should therefore strongly dissuade any one from applying the plumbline to any instrument except the zenith sector, as it may in all other cases be either advantageously replaced by a level or superseded by observations from mercury. [ZENITH SECTOR.]

(Pearson's *Astronomy*, vol. ii., p. 285, and most of the circles described in that work; Pond, 'On the Westbury Circle,' *Phil. Trans.*, 1806, p. 420; 'Circle,' Brewster's *Cyclopædia*.)

PLUTARCHUS was a native of Chæronea in Bœotia. The time of his birth is uncertain, and can only be approximately ascertained from the circumstance stated by himself, that he studied philosophy under Ammonius at Delphi, at the time when Nero was making his progress through Greece, which was in the twelfth year of the emperor's reign, or A.D. 66 (*Περὶ τοῦ Εἰ ἐν Δελφοῖς*, c. 1). The family of Plutarch was one of some consideration in Chæronea, and had held the chief offices in that city. Plutarch mentions his great-grandfather Nicarchus, who told him what the citizens of Chæronea suffered from Antony's soldiers; and he speaks of his grandfather Lamprias as a good-humoured man and an agreeable companion. He has not mentioned his father's name in his extant works. He had two brothers, Timon and Lamprias, to whom he was much attached. When a young man, he was sent with another person on a mission to the proconsul of the province. His companion was from some cause left behind, and Plutarch executed the business himself (*Πολιτικὰ παραγγέλματα*, c. 20).

It has sometimes been asserted that Plutarch visited Egypt, but there is no authority for this assertion, and such a conclusion cannot be drawn, as it sometimes has been, from such slender premises as are furnished by the fact of his writing an essay on Isis and Osiris. Plutarch visited Italy and Rome, perhaps more than once, and he spent some time there, as appears from his own writings (*Life of Demosthenes*, c. 2); but he did not learn the Latin language in Italy, according to his own account; and the reason that he gives for not then learning it is a curious one: 'he had so many public commissions, and so many people came to him to receive his instruction in philosophy.' 'It was therefore,' he adds, 'not till a late period in life that I began to read the Latin writers.' It appears clearly enough from his own writings that he never thoroughly mastered the Latin language, and was very imperfectly acquainted with the antient institutions which formed the groundwork of the Roman polity and the Roman character. It has been conjectured with reasonable probability that his moral writings contain much of the matter which he delivered in his public lectures in Italy. He wrote his Life of Demosthenes at Chæronea, after he had visited Rome, but whether he wrote any of his Lives during his long residence in Rome is uncertain. It may be that they are the work of his old age, and that all of them were written or finished in his native city.

It is generally said that Plutarch was the preceptor of Trajan, and was raised by him to the consular rank; but these facts rest on the assertion of Suidas (*Πλούταρχος*), and on an extant letter addressed to Trajan, which is attributed to Plutarch. It is true that in the dedication of the Apophthegms (*Ἀποφϑέγματα βασιλέων καὶ στρατηγῶν*) to Trajan, Plutarch says nothing about either of these circumstances; but then it is argued that the Apophthegms are not by Plutarch, for he says in the dedication, that he had already written the lives of illustrious Greeks and Romans; and if we admit that he wrote the Lives at Chæronea when he was an old man, and that he did not return there till after Trajan's death, it follows that he did not write the Apophthegms, or at least the dedication prefixed to them. But the letter to Trajan, which is attributed to Plutarch, bears conclusive internal testimony of being a fabrication. Besides this, it only exists in Latin, and in the 'Policraticus' of John of Salisbury; the Greek original has never been produced, and it is not known where John found this letter.

Plutarch seems to have enjoyed considerable distinction at Rome, and his lectures, which of course were delivered in the Greek language, were attended by most of those who affected philosophy. His lectures were given as early as the reign of Domitian, or perhaps even in the reigns of Vespasian and Titus, as we learn from a curious anecdote of his own (*περὶ πολυπραγμοσύνης*, c. 15); and he enjoyed the friendship of several distinguished Romans, as Arulenus Rusticus, whom Domitian put to death (Tacit., *Agr.*, 2), and Sossius Senecio, a man of consular rank, whom he addresses in the introduction to the Life of Theseus, and elsewhere in his writings.

Among his contemporaries at Rome were Persius, Lucan, the younger Pliny, Martial, Quintilian, and others, but none of them have made any mention of Plutarch, though he must have been known to them. Sossius Senecio, one of his intimate friends, was also a friend of the younger Pliny, who addresses him in his Letters. He retired to Chæronea in the decline of his life, where he appears to have lived in comfort. He faithfully discharged various magisterial offices in his native town, and he had also the honour and emoluments of a priesthood.

Plutarch had a wife,. Timoxena, to whom he was tenderly attached, and four sons, and a daughter, Timoxena. Two of his sons died before him, and he lost his daughter while an infant. It was on the occasion of this child's death that he wrote that affectionate letter of consolation, full of good sense, in which he has perpetuated the virtues and fortitude of a most exemplary wife and mother (*Παραμυϑητικὸς πρὸς τὴν ἰδίαν γυναῖκα*).

The time and circumstances of Plutarch's death are unknown, and indeed the events of his life, as will appear from this sketch, are imperfectly ascertained; but the character of the man is as familiar to us from his own writings as if we possessed the most elaborate biography of him.

The great work of Plutarch is his 'Parallel Lives' (*Βίοι Παράλληλοι*), which contains the biography of forty-six distinguished Greeks and Romans, besides the Lives of Artaxerxes Mnemon, Aratus, Galba, Otho, and Homer, which last is probably not by him. The forty-six Lives are arranged in pairs or sets, each of which contains a Greek and a Roman, and the two lives in each pair are followed by a comparison of the characters of the two persons. These Lives are—Theseus and Romulus, Lycurgus and Numa, Solon and Valerius Publicola, Themistocles and Camillus, Pericles and Fabius Maximus, Alcibiades and Coriolanus, Timoleon and Æmilius Paulus, Pelopidas and Marcellus, Aristides and Cato Major, Philopœmen and Flamininus, Pyrrhus and Marius, Lysander and Sulla, Cimon and Lucullus, Nicias and Crassus, Eumenes and Sertorius, Agesilaus and Pompeius, Alexander the Great and Julius Cæsar, Phocion and Cato Minor, Agis and Cleomenes and the two Gracchi, Demosthenes and Cicero, Demetrius Poliorcetes and M. Antonius, Dion and M. Brutus. The biographies of

Epaminondas, Scipio, Augustus, Tiberius, Caligula, Claudius, Nero, Vitellius, Hesiod, Pindar, Crates the Cynic, Daiphantus, Aristomenes, and the poet Aratus, are lost.

Plutarch's son Lamprias made a list of his father's works, *Πλουτάρχου βιβλίων πίναξ*, which is partly preserved, and printed in the 'Bibliotheca Græca' of Fabricius.

In the department of biography, Plutarch is the only writer of antiquity who has established a lasting reputation. The plan of his biographies is briefly explained by himself in the introduction to the Life of Alexander the Great, where he makes an apology for the brevity with which he is compelled to treat of the numerous events in the lives of Alexander and Cæsar. 'For,' he says, 'I do not write Histories, but Lives; nor do the most conspicuous acts of necessity exhibit a man's virtue or his vice, but oftentimes some slight circumstance, a word or a jest, shows a man's character better than battles with the slaughter of tens of thousands, and the greatest arrays of armies and sieges of cities. Now, as painters produce a likeness by a representation of the countenance and the expression of the eyes, without troubling themselves about the other parts of the body, so I must be allowed to look rather into the signs of a man's character, and thus give a portrait of his life, leaving others to describe great events and battles.' The object then of Plutarch, in his Biographies, was a moral end, and the exhibition of the principal events of a man's life was subordinate to this his main design; and though he may not always have adhered to the principle which he laid down, it cannot be denied that his view of what biography should be, is much more exact than that of most persons who have attempted this style of composition. The life of a statesman or of a general, when written with the view of giving a complete history of all the public events in which he was engaged, is not biography, but history. This extract from Plutarch will also in some measure be an apology for the want of historical order observable in many of the Lives. Though altogether deficient in that critical sagacity which discerns truth from falsehood, and disentangles the intricacies of confused and conflicting statements, Plutarch has preserved in his Lives a vast number of facts which would otherwise have been unknown to us. He was a great reader, and must have had access to large libraries. It is said that he quotes two hundred and fifty writers, a great part of whose works are now entirely lost.

There are two purposes for which the Lives of Plutarch may be read. We may read them for the pleasure of the perusal, which arises from a conviction of the integrity of the writer, and his graphic representations, his benevolent disposition, and the moral end which he always keeps before him. We may also read them for the purpose of a critical investigation into the facts which he has recorded, and for the purpose of supplying from him the defects of other antient authorities. With this latter object we must institute a searching inquiry into the authorities for the several Lives, which vary greatly in value; and above all we must be careful in reading his Lives of the Romans not to be misled by any notions that he had formed of the institutions of a people with whose language he was imperfectly acquainted, and to whose antient history he was nearly a stranger. On the sources of Plutarch's Lives the reader may consult an essay by A. H. L. Heeren, *De Fontibus et Auctoritate Vitarum Parallelarum Plutarchi Commentationes IV.*, Goettingæ, 1820, 8vo.

Besides the Lives, a considerable number of Plutarch's essays may be styled historical. They may all be read with pleasure and some of them with instruction, not so much for their historical value as for the detached curious facts that are scattered so profusely through Plutarch's writings, and for the picture which they exhibit of the author's own mind. In one of these essays, entitled 'On the Malignity of Herodotus' (*περὶ τῆς Ἡροδότου κακοηϑείας*), he has, unfortunately for his own reputation, attacked the veracity and integrity of the father of history, and with the same success that subsequent writers, more ignorant and less honest, have made their puny attacks on a work the merit of which the closest criticism may enhance but can never depreciate. (*Journal of Education*, vol. vii., p. 128.) The 'Lives of the Ten Orators,' which are attributed to Plutarch, are of little value, and may not be his; still they bear internal evidence, at least negatively, of not being of a later age than that of Plutarch.

The Lives of Plutarch first appeared in a Latin version by several hands, at Rome, in 2 vols. fol., about 1470. This Latin version formed the basis of various Spanish and Italian translations. The first Greek edition was printed by Philip Giunta, Florence, 1517, fol. Among more recent editions are those of Bryan, London, 1729, 5 vols. 4to., in Greek and Latin, which was completed by Moses du Soul, after Bryan's death; that of Coray, Paris, 1809-1815, 6 vols. 8vo.; and that by Schaefer, Leipzig, 1826, 6 vols. 8vo. The translations are very numerous. The best German translation is said to be by Kaltwasser, Magdeburg, 1799-1806, 10 vols. 8vo. Another German translation appeared at Vienna, in 1812. The best Italian translation is by Pompei. The French translation of Amyot, which appeared in 1559, has considerable merit, and has been often reprinted. The English translation of Sir Thomas North, London, 1612, which is avowedly made from that of Amyot, is often very happy in point of expression, and is deservedly much esteemed. The Lives were also translated into French by Dacier, Paris, 8 vols. 4to., 1721. The translation sometimes called Dryden's, the first volume of which was published in 1683, was executed by a great number of persons. According to a note by Malone (Dryden's *Prose Works*, ii., p. 331), there were forty-one of them. Dryden himself translated nothing, but he wrote the dedication to the duke of Ormond, and the Life of Plutarch, which is prefixed to the translation. The last English translation is by John and William Langhorne, an insipid and tasteless version, which has the merit of being tolerably correct in rendering the meaning of the original. It has a few notes of little value, and is prefaced by a very uncritical and ill-written Life of Plutarch. There is an edition of this version by archdeacon Wrangham, with corrections and additions, which add little to the value of the Langhornes' labours.

The other writings of Plutarch, which consist of about sixty essays, are generally comprehended under the title of his 'Moralia, or Ethical Works,' many of them being entirely of an ethical character. The minor historical pieces already referred to, of which that on the malignity of Herodotus is one, are usually comprised in the collection entitled 'Moralia.' Plutarch was fond of the writings of Plato; he was strongly opposed to the Epicureans: if he belonged to any philosophical sect, it was that of the Academics. But there is nothing like a system of philosophy in his writings, and he is not characterised by depth of thought or originality. He formed for himself a system, if we may so name that which had little of the connected character of a system, out of the writings of various philosophers. But a moral end is always apparent in his 'Moralia' as well as in his Biographies. A kind humane disposition and a love of everything that is ennobling and excellent, pervade his writings, and give the reader the same kind of pleasure that he has in the company of an esteemed friend, whose singleness of heart appears in everything that he says or does. Plutarch rightly appreciated the importance of education, and he gives many good precepts for the bringing up of children. His philosophy was practical, and in many of its applications, as for instance his 'Letter of Consolation to Apollonius,' and his 'Marriage Precepts,' he is as felicitous in expression as he is sound in his precepts. Notwithstanding all the deductions that the most fastidious critic may make from Plutarch's moral writings, it cannot be denied that there is something in them which always pleases, and the more the better we become acquainted with them; and this is no small merit in a writer.

Plutarch's style bears no resemblance to the simplicity of the Attic writers. It has not the air of being much elaborated, and apparently his sentences flowed easily from him. He is nearly always animated and pleasing, and the epithet pictorial may be justly applied to him. Sometimes his sentences are long and ill constructed, and the order of the words appears not the best that could be chosen to express his meaning: certainly it is not the order in which the best Greek writers of an earlier age would have arranged their thoughts. Sometimes he is obscure, both from this cause and the kind of illustration in which he abounds. He occasionally uses and perhaps affects poetic words, but they are such as give energy to his thoughts and expression to his language. Altogether he is read with pleasure in the original by those who are familiar with him, but he is somewhat harsh and crabbed to a stranger. It is his merit, in the age in which he lived, treating of such subjects as biography and morals, not to have fallen into a merely rhetorical style, to have balanced antitheses, and to have contented himself with the inanity of commonplaces. Whatever he says is manly and invigorating in thought, and clear and forcible in expression. A word should be said of those digressions in which his Lives abound. 'I have always been pleased,' says Dryden, 'to see him and his imitator Montaigne, when they strike a little out of the common road; for we are sure to be the better for their wanderings. If we mark him more narrowly, we may observe that the great reason of his frequent starts is the variety of his learning; he knew so much of nature, was so vastly furnished with all the treasures of the mind, that he was uneasy to himself, and was forced, as I may say, to lay down some at every passage, and to scatter his riches as he went: like another Alexander or Adrian, he built a city or planted a colony in every part of his progress, and left behind him some memorial of his greatness.' (*Life of Plutarch*, by Dryden.)

The first Greek edition of the 'Moralia,' which is exceedingly incorrect, was printed by the elder Aldus, with the following title, 'Plutarchi Opuscula, lxxxxii.,' Gr., Venetiis, 1509, fol. It was afterwards printed at Basel, by Froben, 1542, fol., and 1574, fol. The only good edition of the 'Moralia' is that printed at Oxford, and edited by D. Wyttenbach, who laboured on it twenty-four years. This edition consists of six volumes of text (1795-1800), and two volumes of notes (1810-1821), 4to. There is a print of it which is generally bound in 5 vols. 8vo., with two volumes of notes. The remarks of Wyttenbach were printed at Leipzig, in 1821, in two vols. 8vo.

The first edition of all the works of Plutarch is by H. Stephens, Geneva, 1572, 13 vols. 8vo., which is said to be correctly printed. This edition was reprinted several times. A complete edition, Greek and Latin, appeared at Leipzig, 1774-1782, 12 vols. 8vo., with the name of J. J. Reiske, but Reiske did very little to it, for he died in 1774. An edition by J. C. Hutten, appeared at Tübingen, 1791-1805, 14 vols. 8vo. A good critical edition of all the works of Plutarch is still wanted.

The 'Moralia' have been translated into French by Amyot. Amyot's complete translation of all the works was reprinted at Paris by Didot, 1818-1820, 25 vols. 8vo. The 'Moralia' have been translated into German by Kaltwasser.

PLUTO (Πλούτων), more frequently called by the Greeks Hades (Ἅιδης), and by the Romans *Orcus* and *Dis*, was the brother of Zeus and Poseidon, and the deity that presided over the region where the departed souls of men were placed. Hades, which is also written without an aspirate, Ades, is a word of uncertain etymology. Pluto is supposed to be connected with the Greek word signifying wealth (πλοῦτος), since the precious metals are found beneath the earth's surface, below which the abode of Hades was generally placed. The Latin Dis has the same meaning. Orcus is probably connected with the words εἴργω and *arceo*, and may signify 'bound or restrained.'

Pluto is represented by the antient writers as a gloomy deity, inexorable to the prayers of mortals, and hated by the human race above all the gods. (*Il.*, ix. 159.) His wife was Persephone, called by the Romans Proserpina. [Proserpina.]

In the 'Iliad' (ix. 569; xx. 61; xxiii. 100) and in the 'Theogony' of Hesiod (455, 767), the abode of Hades is said, as has been already stated, to be beneath the earth; but in the 'Odyssey' it is placed in the regions of darkness beyond the stream of ocean. (*Od.*, x. 508; xii. 81.)

In later writers the word Hades also signifies the abode of the dead, as well as the deity who presided over it.

The temples and statues of Pluto appear to have been very few. Pausanias relates (i. 28, § 6), that there was a statue of Pluto in the temple of the Eumenides on the Areiopagus of Athens; and the same writer also informs us (v. 20, § 1) that there was a statue of this god in the temple at Olympia, but he mentions no temple sacred to Pluto in any part of Greece.

PLUTONIC. Rocks of igneous origin and antient geological date are thus designated in many modern works. In publications relating to the controversy between Wernerians and Huttonians, the former are often styled Neptunists, the latter Plutonists. In Brongniart's 'Tableau des Terrains,' these rocks are separated from volcanic rocks, on the hypothesis that the latter are specially rocks of fusion, but placed with them in one class of Typhonian rocks. Granite, syenite, porphyry, eurite, and pitchstone are Plutonic rocks. The term is not synonymous with the word Hypogene, as defined by Mr. Lyell.

PLUTUS (Πλοῦτος), the god of wealth, is said by Hesiod (*Theog.*, 969) to have been the son of Demeter and the hero Jasius. He appears as an actor in the comedy of Aristophanes named after him; but we have no particulars respecting his worship. In the temple of Fortune at Thebes, Plutus was represented as a child in the arms of Fortune (Paus., ix. 16, § 1), and at Thespeia in Bœotia there was a statue of Plutus placed by the side of one of Athena Ergane. (Paus., ix. 26, § 5.)

PLUVIA'LIS. [Plovers.]

PLYCTO'LOPHUS. [Psittacidæ.]

PLYCTOLOPHI'NÆ. [Psittacidæ.]

PLYMOUTH, a seaport, corporate, and market town in Devonshire, 192 miles in a direct line west-south-west of St. Paul's, London, and 216 miles from the General Post-Office, London, by the South-western Railroad to Basingstoke, and from thence by mail-road through Whitchurch, Andover, Amesbury, Wincanton, Ilminster, Exeter, and Ashburton; in 50° 17′ N. lat. and 4° 8′ W. long. It is the easternmost of the three towns which lie on the north shore of the Sound. The others are Stonehouse and Devonport. [Devonport; Stonehouse.]

Plymouth was originally inhabited by fishermen. By the Saxons it was called Tameorworth; after the Conquest it was called Sutton (*i.e.* South-town), which name is retained by an inlet of the Sound, Sutton Pool, on the shore of which the town is partly built. In the time of Edward I. the northern part of the town, built on the land of the priory of Plympton, was distinguished as Sutton-Prior, and the southern part, built on the estate of the Valletorts, as Sutton-Valletort. In the reign of Henry VI. these names were superseded by that of Plymouth, which the town still retains. Plymouth was attacked by the French in the reign of Edward III., but without success. In the reign of Henry IV. the attempt was repeated, and the town partly burnt, but the castle and the highest part of the town were not taken. In 1438, in the reign of Henry VI., the town was incorporated by charter, and walled in; but it is supposed to have been a borough by prescription at an earlier period. On the dissolution of the monasteries, the lordship of the town and other immunities of the priors of Plympton were granted to the mayor and corporation. In the reign of Elizabeth a new charter was bestowed on the corporation on the solicitation of Sir Francis Drake, who further benefited Plymouth by bringing water to the town from Dartmoor by a winding channel twenty-four miles in length. In A.D. 1579 and 1581 the town suffered much from the plague. In 1588 the Sound was the rendezvous of the fleet destined to oppose the Armada; and in 1596 of the fleet destined to attack Cadiz. In 1626 the plague again broke out, and carried off two thousand persons. In the civil war of Charles I. the town, which had embraced the parliamentary side, was besieged by the royalists under Prince Maurice, but held out until relieved by the earl of Essex (A.D. 1643). It was soon after attacked by the king in his march into Cornwall, and subsequently blockaded by Sir Richard Grenville, but both attempts failed of success.

The town of Plymouth is on the north side of Plymouth Sound, between the two great arms of that harbour, Catwater on the east, and Hamoaze on the west, but at some distance from both. The small inlet of Sutton Pool is close to the town on the east side, and Mill Bay, another inlet, not far from it on the west. On the point at the entrance to Sutton Pool is the citadel, and to the north of this lies the town, consisting of a number of streets, of which the older are irregularly laid out, while those of modern date are on a more regular plan. The limits of the borough comprise the two parishes of St. Andrew and Charles the Martyr, having a joint population, in 1831, of 31,080: part of each parish, lying beyond the corporation boundary, is not included in this statement. The older streets are narrow and ill built, and some of them steep. Up to the commencement of the present century little had been done in the way of local improvement, but since that period great improvements have been made. Building has been extensively carried on; many handsome houses have been built in the suburbs, a new and handsome road formed to connect Plymouth with Stonehouse, and several additions made to the public buildings. The town is well lighted with gas; the supply of water is under the direction of the corporation, and is still furnished by Sir F. Drake's channel or 'leat;' it is received in three large reservoirs, one of them belonging to government, and distributed by iron pipes. There were formerly many public conduits, but having become nuisances, they have been gradually removed; the last six in 1826. The surplus water turns several mills belonging to the corporation.

St. Andrew's church is a spacious structure of antient foundation and varied architecture, having a square embattled tower. In 1825 its interior was repaired and embellished at an expense of upwards of 4469*l.*, but the original order is preserved; it possesses a fine organ, will seat 2500 persons, and is lighted with gas. Charles church was begun just before the civil war of Charles I., but was not completed until after the Restoration, when the exuberant loyalty of the period led to its dedication to king Charles the Martyr. It is a neat building, with a square tower and well proportioned spire. There are two chapels-of-ease, one in each parish, besides three other episcopal places of worship, viz. a mariners' church, a chapel in the citadel, and a licensed room on the Hoe. There are besides chapels for Baptists (two), Independents, Presbyterians, Unitarians, Quakers, Wesleyan, Warrenite, and Bryanite Methodists, and other dissenters, and a Jews' synagogue. The foundation-stone of a new church in St. Andrew's parish, to be called Trinity church, was laid a few months since. There is a splendid hotel, with an assembly-room, and a theatre adjacent to it, both erected by the corporation at a heavy expense. The custom-house, the royal baths, the new hospital, the Athenæum, or building of the Plymouth Institution, the public library, the Freemasons' Hall, and the Mechanics' Institute, are also worthy of notice. The Guildhall is an irregular structure, comprehending the central watchhouse and the town prison. The grammar-school is a substantial stone building.

The harbour of Plymouth comprehends the Sound and its various arms. About fourteen miles south stands the Eddystone lighthouse, built in 1759, on a reef of rocks stretching north and south 100 fathoms, and forming a slope to the south-west. The Sound is a considerable inlet of the English Channel, three miles wide at the entrance from Penlee Point on the west to the opposite headland on the east, and extending inland about three miles to the citadel and town of Plymouth. On the western side of the Sound is Cawsand Bay. The coast all round, except just at the village of Cawsand on the west, and at the inlets of Mill Bay and Sutton Pool on the north, is rocky and abrupt, and the rocky island of St. Nicholas (sometimes called Drake's Island) rises out of the water not far from the north shore. The æstuary of the Tamar forms the harbour for the ships of war, and is called Hamoaze; it opens into the north-western corner of the Sound. The æstuary of the Plym or Lara forms another harbour, chiefly used for merchant vessels, and in time of war for transports, captured vessels, &c., and is called Catwater; it is capable of containing 1000 sail of such vessels. Here is also a wet and dry dock suited to the building of 74-gun ships. Catwater opens into the N.E. corner of the Sound, and has at its mouth the rocky promontory of Mount Batten, opposite Plymouth. It is not so deep as Hamoaze. Sutton Pool is a tide-harbour, also used by merchant vessels; and an act of parliament has just been obtained for the erection of a pier in Mill Bay, for the accommodation of the largest class of steam-ships at all times of the tide (1840). This pier has been determined on in consequence of the great number of steamers which now frequent the port. The harbour of Hamoaze is four miles long, and has a depth of water of fifteen fathoms at ebb tide; there are moorings for nearly one hundred sail of the line. The dock-yard [DEVONPORT] is on Hamoaze. The harbour was long exposed to the heavy sea which rolled into the Sound with gales from the southward, and great damage was at various times done. To remedy this a breakwater or dyke, formed of loose stones, was commenced A.D. 1812; it runs across the middle of the Sound, having a total length of 1700 yards, or nearly a mile, viz. 1000 yards in the centre, which runs in a direction nearly from east to west, with a continuation of 350 yards at each end, turning more to the north, and forming a considerable angle with the direction of the centre.* The efficiency of the breakwater as a protection to the harbour has been proved in several severe gales which have occurred since its commencement. The harbour is defended from hostile attack by the citadel of Plymouth, by the fortifications on the island of St. Nicholas, and by various other batteries.

The population of Plymouth, as well as of the adjacent towns of Stonehouse and Devonport, has increased very much during the present century, as appears from the following statement:—

	1801.	1811.	1821.	1831.
Plymouth . .	16,040	20,803	21,591	31,080
Stoke Damerall Parish (Devonport)	23,747	30,083	33,578	34,883
East Stonehouse .	3,407	5,174	6,043	9,511
	43,194	56,060	61,212	75,534

If we take the increase of the ten years 1321-31 as the basis of our calculation, we may estimate the present population of Plymouth at nearly 40,000; that of Devonport (which has not of late increased so fast) at 36,000; and that of Stonehouse at 12,000: making a total of 88,000. The trade of the town is important, as appears by the custom-house returns for the year 1839, which amounted to 90,000*l.* Besides the business arising from the dockyard at Devonport and the connected establishments, considerable trade is carried on with the West Indies, the Baltic, and the Mediterranean, and coastwise with London and other places; and there is an active fishery, especially of whiting and hake. The imports are timber and West India produce; the exports, manganese to Scotland, wool to Hull, and lead to London and Bristol. There are an extensive sail-cloth manufactory, a sugar refinery, a glass-house, a very large soap factory, and a starch factory. Granite, slate, limestone, and marble, are quarried in the neighbourhood. The limestone or marble of the Oreston quarries, on the shore of Catwater, opposite to Plymouth, was the material chiefly employed for the breakwater. Near these quarries is a beautiful iron-bridge of five elliptical arches over Catwater, built at the sole expense of the earl of Morley. In 1834 a floating steam-bridge was established across the Hamoaze between Devonport and Torpoint, which crosses regularly every quarter of an hour, and conveys the mail-coaches, carriages, horses, and passengers without the least delay or inconvenience. This communication has proved the greatest benefit to the neighbourhood. A railroad, to the extent of 24 miles, connects Plymouth from Sutton Pool to Prince Town, near the prison of war on Dartmoor. There are markets on Monday, Thursday, and Saturday; and two yearly fairs.

The town-council consists of 12 aldermen and 36 councillors; the borough is divided into six wards. Quarter-sessions and petty-sessions (twice a week) are held; and there is a court, entitled the mayor's court, or the borough court, for the trial of civil actions. The yearly revenue of the corporation, arising from tolls at the markets and fairs, from the rents of the mills, the royal hotel, the theatre, and other property belonging to the corporation, and from the water rents, is about 6700*l.* There is a heavy debt. The borough prison, when the inspectors made their second Report (dated 1836), was inadequate for its purpose and under bad management.

Plymouth returned members to parliament in the reigns of Edward I. and II.; and again in the reign of Henry IV., since which time it has regularly sent two. The mayor is the returning officer. The boundaries of the borough for parliamentary purposes were slightly enlarged by the Boundary Act. By the Reform Act, Devonport, with which Stonehouse was incorporated, was formed into a new parliamentary borough, returning two members. The number of voters registered for Plymouth in 1834-5 was 1571; in 1835-6, 1776; for Devonport at the same periods, 1870 and 2083.

The living of St. Andrew is a vicarage united with the chapelry of Pennycross, of the clear yearly value of 920*l.*; together with the patronage of the perpetual curacy of the chapel-of-ease, the clear yearly value of which is 148*l.* The living of Charles is a vicarage, the clear yearly value of which is 612*l.*; the value of the chapelry in this parish is 100*l.* per annum clear.

Among the educational institutions of Plymouth were, in

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* The dimensions of the breakwater are, with the exception of the length, very variously given. In an account published by Johns, Devonport (1819-20), the breadth at the base is given at 210 feet, and 30 feet at the top where the depth of water at ebb tide is 30 feet. Mr. Wightwick gives the dimensions of the breakwater as follows:—breadth at the base 120 yards, at the top 16, length at the base 1760 yards, at the top (including the two arms) 1700; average height 14 yards; slope of the work towards the sea, three horizontal to one perpendicular.'

1833, in the parish of St. Andrew, the Orphans' Aid School, an endowed institution for the maintenance and education of orphans born in the borough, in which were 8 orphans; the Benevolent Institution for clothing and educating 60 girls; a grammar-school, partly endowed, with 50 boys; a new grammar-school, with 33 boys, instituted originally as a proprietary school; 41 other day or boarding and day schools; an infant-school, since given up, with 87 children, and numerous small schools for little children. There were also three Sunday-schools. In Charles parish were an endowed school, with 80 boys and 80 girls; Dame Hannah Rogers's Charity, with 52 girls; a Lancasterian school, with 176 boys and 120 girls; a day and Sunday school, with 60 girls, called the Household of Faith; fifteen other day-schools, and two Sunday-schools. The whole number of children under instruction in the two parishes was returned at about 3200, besides those in the Sunday-schools.

There are a Mechanics' Institute; the Plymouth Institution for the promotion of arts, science, and literature; the Natural History Society of Devon and Cornwall; a public library containing more than 6000 volumes; baths, and a theatre. Races are annually held in a meadow near the town, and a regatta in the Sound. There are an hospital for merchant seamen, a public dispensary, an eye infirmary, and several other charities. There are prisons for prisoners of war at Mill Bay, capable of containing 3000 men.

PLYMOUTH, AMERICA. [Massachusetts.]

PLYMPTON. [Devonshire.]

PNEUMATICI (*οἱ πνευματικοί*), a medical sect founded by Athenæus about the middle or end of the first century A.D. [Athenæus.] Their principal doctrines have been noticed in the life of their founder, and the following is a list of the physicians that belonged to their number:—Archigenes (Galen, *Introduct.*, cap. 9, p. 699, ed. Kühn), Herodotus (Galen, *De Simplic. Medicam. Temper. ac Facultat.*, lib. i., cap. 29, p. 432, and *De Different. Puls.*, lib. iv., cap. 11, p. 751), Agathinus (Galen, *De Dignose. Puls.*, lib. i., cap. 3, p. 787), Magnus (Galen, *De Different. Puls.*, lib. iii., cap. 2, p. 646), Theodorus (Diog. Laërt., *Vit. Philos.*, lib. ii., § 104). To these the name of Athenæus has been added by Le Clerc (*Hist. de la Med.*, p. 508, &c., ed. 1723), Wigan (*Præfat. in Aret.*), Barchusen (*Hist. Medic.*, p. 269), Schulze (*Compend. Hist. Medic.*, Halæ, 1744, p. 332), and Haller (*Biblioth. Medic. Pract.*, tom. i., p. 192, &c.); but the passages brought forward in support of this opinion (for it rests only on internal evidence) are considered to be insufficient to prove the point by Petit (*Præfat. ad Comment. in Aret.*), Osterhausen (*Dissert. Inaugur. de Sectæ Pneumaticorum Medicorum Historia*, Altorf., 1791, 8vo.), and Ackermann (*De Aretæo*, in edit. Kühn). The sect appears to have existed but a short time, namely, from the reign of Vespasian to Antoninus Pius, and never to have enjoyed any great celebrity. For further information concerning it the reader may consult Wigan, Ackermann, and especially Osterhausen, *locis cit.*

PNEUMATICS. This name is given to that part of physics in which are contemplated the mechanical properties of elastic fluids, principally atmospherical air. The word is derived from *πνεῦμα*, 'breath or spirit,' and pneumatology is a term which was once applied to the division of science now called metaphysics.

The mechanical properties of air appear to have been, to a certain extent, known to the antients. Aristotle must have been aware of its materiality, and of its tendency to descend towards the earth, like other heavy bodies, for he observes that if a bladder be filled with air, it weighs more than when empty: the observation proves at least that he had the idea, but it may be doubted whether or not he ever made the experiment, since it is not probable that he had the means of weighing the full bladder in vacuo, or that he could keep it distended when the air was extracted from it. The invention of a species of forcing-pump for raising water, and of instruments for producing sounds by the passage of air through orifices in tubes, both of which are ascribed by Vitruvius (lib. ix., x.) to Ctesibius, who lived about 130 years B.C., are proofs that the elastic force of compressed air must have been then apprehended and made subservient to purposes connected with practical utility.

The ascent of water in pumps, on raising the piston, must have been for ages observed, without a suspicion being entertained of the cause; and the principle that the existence of a vacuum was impossible, was held to afford a sufficient explanation of the phenomenon. Even Galileo, when made aware, by the formation of a vacuum between the piston and the water when the latter was at its greatest height in a pump, that the principle was unfounded, had recourse to another which was equally remote from the truth; for he is said to have ascribed the ascent of the water to the attraction of the piston, and to have accounted for the height of the column never exceeding a certain quantity (about 34 feet) by a supposed equilibrium between the weight of the column and the attractive power of the piston. The steps by which Torricelli arrived at the discovery of the true cause of the phenomenon, and, at the same time, the determination of the pressure of the atmosphere by the weight of the column of mercury supported in a tube closed at the upper extremity, are mentioned under the word Barometer.

Soon after the commencement of the seventeenth century, the idea of ascertaining with precision the state of bodies with respect to temperature by the expansion of fluids when acted on by heat, is said to have occurred to the members of the Academy del Cimento at Florence; and this gave rise to the invention of an instrument of great importance, as well for many occasions of ordinary life, as for the purposes of pneumatical science. [Thermometer.]

The desire of perfecting the theory for determining the heights of mountains by the barometer, led to numerous researches in order to ascertain the relations between the condensation of air and the forces compressing it, and also to discover the effects produced by variations of temperature. About the year 1660, Boyle in England and Mariotte in France determined from experiments, that when the temperature was constant, the density of air was proportional to the compressing force; but it was not till a century afterwards that De Luc determined the expansion consequent upon given increments of temperature.

In the beginning of the eighteenth century, steam began to be employed as a moving-power for pumps and other machinery. The law of the resistance of the air to bodies moving in it was discovered by Sir Isaac Newton; but the intensity of this resistance against military projectiles was first determined, for the inferior velocities, by Robins, in 1740; and Dr. Hutton subsequently obtained a formula which, with perhaps sufficient correctness, may be employed with any velocity whatever. The expansion of fired gunpowder has been determined from the researches of Robins, Euler, and Hutton; and that of steam has been investigated by Dalton in England, and by Prony, Arago, and other members of the Institute, in France.

If a fluid be conceived to be perfectly elastic, it is evident that it can be made to occupy a given volume only by being confined within a close vessel, or by the pressure of a circumambient fluid. In the latter case it is easy to perceive that while the temperature of the elastic fluid remains the same, the spaces occupied by it will be diminished when the compressing force is increased, and increased when the latter is diminished; and that the density, or degree of closeness of the particles, will vary directly with the changes of volume. Now the compressing forces which are made to act on the surface of an elastic fluid are usually estimated in terms of the pressure exerted by a vertical column of the atmosphere, its base being equal to some unit of superficies, as one square inch or foot. Whatever be the constitution of such column, its weight or pressure is known, in a given state of the atmosphere, by direct experiment, and this is usually designated the pressure of one atmosphere: the same pressure is also frequently expressed by the height of the column of mercury which is supported in a barometer-tube by the counteracting weight of the atmospherical column.

A simple experiment suffices to show the relation between the density and elasticity of a fluid and the compressing force. Let mercury be poured into a bent tube open at one end and closed at the other; the sum of the weights of the column of mercury, and of the atmosphere above it in the open tube, will reduce the air in the closed tube to a volume less than that which it previously occupied. Let, then, more mercury be added, and the volume of air will be still further reduced at every addition of mercury; and it will be found that the volumes of air vary inversely as the sums of the weights of the mercury and atmosphere. Therefore, since the density of an elastic fluid is inversely proportional to the space it occupies, it follows that the densities are directly proportional to the compressing weights; and since the weights of the mercury and atmosphere together, in the open tube, are balanced by the elastic power of the condensed air in the close tube, that elastic force is also directly proportional to the compressing force, that is, to the density. [AIR.] This is the law of Boyle and Mariotte, and though it cannot be said to be absolutely correct, it is very generally employed.

The following table, extracted from the results of the experiments made by MM. Prony, Arago, and others, exhibits the volumes and elasticities of a given quantity of atmospherical air under different pressures, the temperature being nearly constant, and expressed by 14° of the centigrade thermometer (57·2° Fahrenheit), and, as far as it extends, it confirms the law above mentioned. The first of the columns expresses the pressure or elasticity in multiples of the weight of an atmospherical column; the second expresses the same by the height, in inches, of the column of mercury supported in a barometer tube; and the third column contains the corresponding volumes.

Atmospheres.	Inches, Eng.	Volumes.
1	30	1·0000
5	150	·1989
11·3	339	·0884
16·5	495	·0601
21·7	651	·0457
24	720	·0411
27	810	·0369

The law being admitted, it may be proved that the particles of an elastic fluid repel each other with a force which varies inversely as the distance between them. For let the volume of fluid be in the form of a cube, and let the compressing force act perpendicularly on one of its faces; then, if d represent the distance between every two nearest particles of fluid, the number of particles in the surface pressed will vary as $\frac{1}{d^2}$. Now assume that the repulsive force (perpendicularly to that surface) between every two nearest particles in the volume varies as d^n; then the whole repulsive force on that surface, and, consequently, the compressing force, will vary as d^{n-2}. If D represent the density of the fluid, d will vary as $\frac{1}{D^{\frac{1}{3}}}$, or $D^{-\frac{1}{3}}$; therefore, substituting $D^{-\frac{1}{3}}$ for d in the last expression, the whole repulsive force varies as $D^{-\frac{1}{3}(n-2)}$. But, agreeably to the law above mentioned, the compressing force varies as D; therefore the exponent $-\frac{1}{3}(n-2)$ must be equal to unity, and hence $n = -1$. It follows therefore that the repulsive force between every two nearest particles varies as d^{-1}, or inversely as the distances of those particles from each other. Sir I. Newton however observes (lib. ii., prop. 23, schol.) that this law holds good only when the repulsive power of any particle does not extend much beyond those which are nearest to it.

If P and P′ represent the pressures exercised upon a square unit of the superficies bounding an elastic fluid, and the volumes of the fluid under those pressures be V and V′; also if the densities be D and D′ respectively, we shall have

$$P : P' :: V' : V, \text{ or } P.V = P'.V',$$
$$\text{and } P : P' :: D : D', \text{ or } P.D' = P'.D;$$

whence, by equality of ratios,

$$V : V' :: D' : D, \text{ or } D.V = D'.V'.$$

Considerable difficulty is found in determining the specific gravities of gases with precision, and different experimenters have obtained results which do not exactly agree. The value generally adopted for air, when the height of the column of mercury in the barometer is 30 inches, and the temperature by Fahrenheit's thermometer is 55°, is 1·22 ounces avoirdupois, or 534 grains troy. The experiments of Mr. Dalton have led to the conclusion that the weight of a cubic foot of steam when at the temperature of boiling water, and the height of the barometrical column is 30 inches, is 253 grains troy; by others it has been found to be 254·7 grains; and it appears that within considerable limits the expansion of the volume of any gas is proportional to the increments of temperature, measured by the degrees of the thermometer. The absolute value of the expansion is not precisely known; that of air is stated to be equal to about $\frac{1}{480}$, and that of steam about $\frac{1}{459}$ of the volume, for one degree of Fahrenheit's thermometer. [AIR.]

The following table, from the observations of MM. Dulong and Petit, exhibits the volumes assumed by a given quantity of air at different temperatures between the boiling-point and near the freezing-point of mercury:—

Temperatures.	Volumes.
−33°	0·8650
32	1·0000
212	1·3750
302	1·5576
392	1·7389
482	1·9189
572	2·0976
680	2·3125

Now to determine the elastic force, or the equivalent pressure, of air in terms of its density and temperature; let V be the volume of a body of air at any given temperature, suppose 55° (Fahrenheit), and let p be the corresponding pressure, or elastic force, measured by the weight of the column of mercury in the barometer, or by its height, and let d be the number of degrees of temperature above or below 55°. Then, since $\frac{1}{480} = {\cdot}0021$, we have $V(1 \pm {\cdot}0021d)$ for the volume of the air at the temperature $55° \pm d$. Let also D represent the density or specific gravity of the air at the temperature 55°; then, since the density is inversely proportional to the volume, we have the density at the temperature $55° \pm d$ equal to $\frac{D}{1 \pm {\cdot}0021d}$; let this be represented by D′. Now, if the pressure p be varied and become P without changing the temperature; since then the pressure, or elastic force, is proportional to the density, we have $p : P :: D' : D''$ (= the density of the air under the pressure P); consequently $P = \frac{D''p}{D'}$, or $= \frac{D''p(1 \pm {\cdot}0021d)}{D}$. And, if p be expressed by the weight of a column of mercury whose base is one square inch (= 14·75 pounds), this value of P is the required pressure upon a square inch of the surface of the air.

The density of an elastic fluid being proportional to the force which compresses it, and the volume increasing proportionally to the temperature; it follows that the density of an elastic fluid varies directly as the compressing force and inversely as the temperature.

From experiments it has been concluded that, while steam is in contact with the water from which it is formed, its expansive force increases in a geometrical progression; when its temperature is increased, in an arithmetical progression; but the relation between the elastic force of this gas and its temperature, in that state, is as yet far from being certainly known. Under the word ELASTICITY is given a table of the elastic forces of steam at temperatures between the freezing and boiling states of water; and the following table, extracted from those which have been formed from the results of the experiments of Mr. Dalton, Dr. Ure, and the members of the French Institute, may also be useful as a means of affording a near estimate of the force at high temperatures. The first column contains the temperature of the water and steam in degrees of Fahrenheit's thermometer; the second is the measure of the expansive force by the number of inches in the height of the column of mercury which on a given superficies would counterbalance it; and the third, the like measure expressed by multiples of the weight of the atmospherical column when the air is in its ordinary state.

Temperature.	Inches, English.	Atmospheres.
212°	30	1
220	35·54	1·18
240	51·7	1·72
260	72·3	2·41
280	101·9	3·06
300	139·7	4·66
312	165·5	5·52
340	231·	7·7
357	296·79	9·893
389	435·9	14·53
408	541·5	18·05
419	613·2	20·44
435	719·8	23·994

When steam is not in contact with the water from whence it is formed, and when it is subject to a constant pressure under which it may expand in every direction (as when it is formed in the atmosphere), an increase of temperature will not produce an increase of density, but merely of its elastic power. Now, if we suppose steam to expand $\frac{1}{459}$

or ·00218 of its volume for an increment of temperature expressed by one degree (Fahrenheit); and it be admitted from the experiments of Mr. Dalton that a cubic foot of water produces 1711 cubic feet of steam at a temperature equal to 212° (boiling water):—Then, letting V represent the volume of steam at a temperature expressed by zero, we have $1·462\,V = 1711$; whence $V = 1170·3$: and, if t represent the given temperature in degrees of Fahrenheit's thermometer, $(1 + ·00218\,t)\,V$, or $1170·3 + 2·55\,t$, will express the volume of the steam at the temperature t, when subject to a constant pressure.

But if the steam is incapable of changing its volume, as when it is contained in a close vessel, the elastic force increases by an increase of temperature in the same proportion as the volume would have increased under a constant pressure; consequently the elastic force at the temperature 212° being represented by 30 inches (the height of the counterbalancing mercurial column), we have

$$1711 : 1170·3 + 2·55t :: 30 \text{ in.} : 20·52 + ·0447t;$$

and the last term of the proportion expresses, in inches, the height of the mercurial column equivalent to the elasticity at the temperature t; the volume of the steam being equal to 1711 cubic feet, as at the temperature = 212°. Let this elasticity be represented by E; then the volumes of any given quantity of elastic fluid, at equal temperatures, being inversely proportional to the pressures by which they are prevented from expanding, we have the following proportion:—

As any given compressing force (represented by the height of the mercurial column corresponding to some temperature t in the above table), is to the elastic force or pressure (= E) due to that temperature t, when the volume of the steam = 1711; so are 1711 cubic feet (= the volume of steam produced by a cubic foot of water at 212° under a constant pressure equal to the atmosphere), to the volume (in cubic feet) of the steam produced by a cubic foot of water under the given compressing force. Let this be represented by v.

Now the quantities of matter being the same, the specific gravities of bodies are inversely proportional to their volumes; and the specific gravity, or weight of a cubic foot, of steam being known from experiment to be 254·7 grains, when the cubic foot of water produces 1711 cubic feet of steam, we have

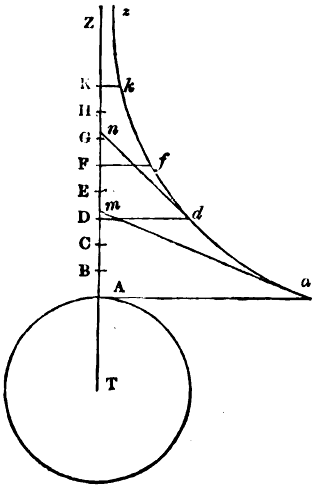
$$v : 1711 :: 254·7 : \frac{435792}{v} :$$

and the last term is the specific gravity, or weight in grains, of a cubic foot of steam at a given temperature and under a given pressure.

Mr. Robins found that the volume of air disengaged from gunpowder is equal to about 244 times the volume of the powder itself; and that its expansive force, when increased by the heat which is generated at the time of the explosion, is about 1000 times as great as the pressure of the atmosphere in its ordinary state. It must consequently exert a pressure against a cannon-ball, and the interior of the chamber of the gun, equal to nearly 15,000 pounds upon every square inch of the surface upon which it acts. Both D. Bernouilli and Euler however make this pressure still greater.

The fact that the density of air varies with the compressing force is sufficient to show that the atmosphere about the earth cannot be of uniform density; and it is also evident that the density must diminish from the surface of the earth upwards, according to some law depending on the height of any point above the earth, or rather upon the weight of the mass of air above that point. It might, at first, be supposed that the atmosphere would extend upwards to a height at which the centrifugal force of the particles of air (by the diurnal revolution) is equal to the force of gravitation; and it is shown by Poisson (*Traité de Mécanique*, tom. ii., 619) that, conformably to this principle, the height of the atmosphere at the equator should be equal to about five times the semi-diameter of the earth. But it is probable that, long before this height is attained, the air loses its elasticity by the cold in the upper regions, or that its expansion is destroyed by the pressure of the ethereal fluid which is diffused through infinite space. By the duration of twilight it is inferred that the atmosphere is capable of reflecting the sun's rays at the height of about 45 miles above the earth, and it is probable that some light is reflected from a still more elevated region.

In order to determine the law by which the density of the atmosphere diminishes at increasing distances from the earth's surface, on the supposition that the action of gravity and the temperature of the air are constant, let T be the centre of the earth, and let AZ be the height of a very slender column of air extending vertically upwards to the top of the atmosphere. Also let the atmosphere be divided into an infinite number of concentric strata of equal thicknesses, which latter represent by AB, BC, CD, &c.; and, as these thicknesses are small, let the density of the air in each stratum be uniform and equal to that which is due to the weight of all the strata above it.



Let d_1, d_2, d_3, &c. represent the densities of the several strata whose heights are AB, BC, CD, &c.; these terms may also represent the weights of the slender columns AB, BC, CD, &c.: consequently the weights of the columns AB, AC, AD, &c. may be respectively represented by d_1, $d_1 + d_2$, $d_1 + d_2 + d_3$, &c. Then, the density in each stratum being proportional to the weight, or sum of the densities, of all above it, we have

$$d_1 : d_2 + d_3 + d_4 + d_5 + \&c. :: d_2 : d_3 + d_4 + d_5 + \&c. \qquad \text{(I)}$$

In like manner

$$d_2 : d_3 + d_4 + d_5 + d_6 + \&c. :: d_3 : d_4 + d_5 + d_6 + \&c. \qquad \text{(II)}$$

or, by composition,

$$d_2 : d_2 + d_3 + d_4 + d_5 + \&c. :: d_3 : d_3 + d_4 + d_5 + \&c. \qquad \text{(III)}$$

In like manner

$$d_3 : d_3 + d_4 + d_5 + \&c. :: d_4 : d_4 + d_5 + d_6 + \&c. \qquad \text{(IV)}$$

Then, from (I) and (III), by equality of ratios, we have

$$d_1 : d_2 :: d_2 : d_3.$$

And, from (II) and (IV), by equality of ratios, we have

$$d_2 : d_3 :: d_3 : d_4;$$

and so on.

Thus d_1, d_2, d_3, d_4, &c. are in a geometrical progression decreasing.

Now AB, AC, AD, &c. form an arithmetical progression increasing; or, reckoning both the heights and the densities from any point, as K, downwards, the former (that is, KH, KG, KF, &c.) form an arithmetical progression, and the densities in KH, HG, GF, &c. form a geometrical progression, both increasing. But a series of numbers in an arithmetical progression being made to correspond to a series in geometrical progression, the former numbers are logarithms of the latter; and thus the distances KH, KG, KF, &c. may be considered as representing the logarithms of the densities in the strata KH, HG, GF, &c. respectively.

Hence, if there existed a table of logarithms formed on the two series just mentioned, the height of any point, as C, above another, as A, would be equal to the difference between the logarithms of the densities of the air at those points; or by the nature of logarithms, we should have AC = $\log. \frac{dens.\ at\ A}{dens.\ at\ C}$. But such a table is unnecessary, since, from the properties of logarithms and of the logarithmic curve, the value of AC may be found by means of the common tables. Imagine any point K to be the origin of the abscissæ (represented by x) on the vertical line ZA; and imagine any horizontal ordinates Kk, Ff, &c. (represented by y) to be drawn; then, if KF, KD, &c. be proportional to the logarithms of Ff, Dd, &c., the line $adfk$, &c. is called the logarithmic curve, and its equation is $\log. y = x \log. a$, or $y = a^x$ [Logarithmic Curve], where a is some constant which is called the base of the system of logarithms appertaining to the particular curve.

Now it has been demonstrated by mathematicians, that if tangents am, dn, &c. be drawn from any points in the curve, the subtangents Am, Dn, &c. will be equal to one another; and that the area comprehended between the infinite branch az of the curve, its asymptote AZ, and any ordinate Aa, is equal to the product of the constant subtangent, or modulus of the curve, and that ordinate: hence the area between Aa and the infinitely remote summit Z is equal to Aa × Am. Also, by the nature of logarithms, the logarithms of the same natural number in different systems of logarithms bear to one another the same proportion as the moduli of those systems. We have therefore only to find the value of the subtangent Am, or modulus, for what may be called the atmospherical logarithms; and, from the last-mentioned property, the above value of AC may be transformed into an expression containing common logarithms.

Let h denote the height of a homogeneous atmosphere whose density is equal to that of the real atmosphere at the surface of the earth, which density is represented by the line Aa in the above diagram; then h × Aa will represent the weight of such homogeneous atmosphere, or its pressure on the point A. But the area between Z A, Aa, and the curve being supposed to be made up of the infinite number of ordinates Aa, Dd, Ff, &c., which, severally, represent the densities of the air at the points A, D, F, &c. in the infinitely high column A Z of atmospherical air; that area, viz. Aa × Am, may represent the weight of such column, or the pressure of the real atmosphere on the point A; this being made equal to the former pressure, it is evident that we shall have Am = h. Thus the height of a homogeneous atmosphere exercising at A the same pressure as the real atmosphere, will be the subtangent, or modulus, of the atmospherical logarithms. The value of h is determined by a proportion in which the heights of the column of homogeneous air, and the column of mercury which holds it in equilibrio, are to one another inversely as the specific gravities of the two fluids. [Hydrostatics.] Now the specific gravities of air and mercury being, respectively, 1·22 and 13568; and the height of the column of mercury in the barometer being 30 inches when the temperature is expressed by 55° (Fahrenheit), we get 27803 feet, or 4634 fathoms for the value of h. Then the modulus of the common logarithms being 0·43429, we have

·43429 : 4634 : : common log. $\frac{density\ at\ A}{density\ at\ C}$: 10670 com. log. $\frac{dens.\ at\ A}{dens.\ at\ C}$; and this last term is the equivalent of the above expression for AC.

The height of the column of mercury which is supported by the pressure of the atmosphere varying directly with that pressure; it follows that we may substitute in the last expression the heights of the mercurial columns at A and C for the densities of the air at those points, and thus we have 10670 com. log. $\frac{height\ of\ merc.\ at\ A}{height\ of\ merc.\ at\ C}$ for the value of A C in fathoms. Therefore the heights of the columns of mercury being observed at any two places, as A and C, the height of C above A can be found. [Barometer.] But the factor 10670 may be changed into the more convenient number 10000 by an alteration in the temperature (55° Fahrenheit) on which the former number depends. By experiment it has been ascertained, that if the altitude of one place above another be computed from the above formula, it will vary by $\frac{1}{435}$ of its value for each degree by which the mean of the temperatures at the two stations differs from 55°. Now $\frac{10670}{435} = 24{\cdot}5$ nearly, the variation, in fathoms, for one degree; consequently 24·5: 670 (= the excess of 10670 above 10000) : : 1° : 27° nearly; and therefore 55°−27°, or 28°, is the temperature at which the expression 10000 com. log. $\frac{height\ of\ merc.\ at\ A}{height\ of\ merc.\ at\ C}$ gives the height of C above A in fathoms; and of course this value must be increased or diminished by $\frac{1}{435}$ part of itself for each degree above or below 28° in the mean of the temperatures observed at A and C. [Heights, Measurement of.]

The mountain-barometer, as it is called, is usually provided with an adjusting screw, by which the surface of the mercury in the cistern may be made to coincide with the zero of the scale of inches by which the height of the column is expressed; but those of a more portable kind have not that adjusting screw, and then a correction must be made for the error of the scale. For this purpose, the ratio between the area of the bore of the tube and the interior area of the cistern must be found (it is usually given by the maker of the instrument); let it be as 1 to m: this is also the ratio between the rise or fall of the mercury in the cistern and the corresponding fall or rise of that in the tube. When the surface of the mercury in the cistern happens to coincide with the zero of the scale of inches, the height of the column in the tube is correctly expressed by the scale, and the top of the column is, in that case, called the neutral point, no correction being then necessary. In other cases add $\frac{1}{m}$ of the height shown by the scale to that height, if the latter is greater than the neutral height, or subtract if less; the sum, or difference, is the correct height of the mercury in the tube above the surface of that in the cistern.

Water boils when the elastic power of the vapour formed from it is equal to the incumbent pressure; and consequently the temperature at which the boiling takes place in the open air will depend upon the weight of the atmospherical column above it. Therefore, since this weight becomes less as the station is more elevated, it is evident that water will boil at a lower temperature on a mountain than on the plain at its foot; and the Rev. Mr. Wollaston constructed an instrument called a thermometrical barometer, by which, on the principle just mentioned, the relative heights of stations can be found. A tube containing the mercury is provided with a graduated scale, and, when used, the bulb is placed in a vessel of water, which is made to boil by means of a spirit-lamp.

In order to determine the heights of stations merely by the knowledge of the temperature at which water boils, the formula $F = \left(\frac{t + 75^\circ}{85}\right)^6$ given by Mr. Tredgold, might be employed. Here t is the temperature of the boiling water at the station, expressed in degrees of the centigrade thermometer; F is the measure of the elastic force of the steam at the temperature t under the pressure of the atmosphere, and is expressed by the corresponding height, in centimetres, of the column of mercury in a barometer. This height being thus determined at each of the two stations, as A and C, the difference of the logarithms of the heights being multiplied by 10,000 will give the approximate height AC, which may be then corrected as above.

The velocity with which air flows into a vacuum through an aperture in a vessel follows the same law as water or any other non-elastic fluid [Hydrodynamics]; for though, in the former case, the quantity of air passing through the orifice in a given time varies with the density of that which successively comes to the orifice, yet the pressure by which the air is forced out varying in the same proportion, the velocity, by dynamics, remains constant. Hence we find that a column of air, in its ordinary state, extending to the top of the atmosphere, rushes through an orifice into a vacuum with a velocity (=1339 feet in a second) equal to that with which a heavy body would fall through a height equal to that of a homogeneous atmosphere.

The law is the same, whether we consider the air to act only by its weight, or whether it be confined in a vessel and the efflux be produced by the elasticity. For, the air in the vessel being in the ordinary state of the atmosphere, the pressure against every point on the interior surface is equal to the pressure of the atmosphere by which, if not otherwise confined, it would be kept in its actual state; consequently it begins to flow from the orifice with the same velocity as if it had been impelled by the weight of the whole column of atmosphere above the orifice, that is, with the velocity due to the descent of a body from a height equal to that of a homogeneous atmosphere. After this moment, the density of the air in the vessel diminishing, its elasticity diminishes with it, and consequently the power of motion is diminished in the same ratio as the density; therefore the velocity remains constant. It may be added also that, since the density of air increases with the pressure, an additional pressure on the fluid in a vessel will not in crease the velocity of the efflux. But the law just mentioned only holds good when the vacuum is supposed to remain perfect on the exterior of the orifice; for, if the air be received in a vessel, it will expand in that vessel and re-act against the effluent air at the orifice, thus diminishing the velocity till the latter finally becomes equal to zero; and this will take place when the air has attained the same density in the two vessels.

If the effluent air be of a given density, but not the same as in the ordinary state of the atmosphere, the force by which it would be made to flow into a vacuum must be determined by the above equation $PD' = P'D$; where P is the pressure (or weight of the column) of the ordinary atmosphere, and D its density at the earth's surface; D′ is the given density and P′ is the required pressure or force by which that air would be impelled through the orifice. Now if air in the ordinary state be allowed to rush into a vessel containing air less dense than itself, and the velocity of efflux be required, the moving force will be the difference between that with which the ordinary air is driven through the orifice and that with which the rarer air would be so driven; that is, it may be represented by $P-P'$; then the velocities of efflux being as the square roots of the forces [Hydrodynamics], if the velocity due to the force P is given, the required velocity at the commencement of the efflux may be found.

The determination of the velocity with which steam or any other elastic fluid rushes into a vacuum, or into a fluid of less density than itself, is made in the same manner as for air. Thus, knowing the temperature of steam, and consequently its elasticity, or the equivalent pressure, we can find the height of a homogeneous atmosphere which would produce the same pressure; and then the velocity with which the steam flows into a vacuum would be equal to that acquired by a body in falling down the height of such atmosphere. But if the steam is to flow into any elastic fluid of less density than itself, the height of the homogeneous atmosphere must correspond to the difference of the pressures arising from the different elasticities of the two fluids.

In order to find the time during which air, being in the ordinary state, must flow through an orifice into an exhausted vessel before the air in the latter acquires any given density D′; let V be the interior volume of the vessel which is to receive the air, and A be the area of the orifice; also let t be the required time. Then $d\,(V.D')$ or $V.dD'$ represents the small quantity of air which may enter the vessel V in the time dt at the commencement of the efflux. Now, let D be the ordinary density of the air, h the height of the homogeneous atmosphere, then $\sqrt{2gh}$ [Hydrodynamics] will be the initial velocity. But, P being the force by which the ordinary air is impelled through the orifice, from the equation $P.D'=P'D$ we have $P'=\frac{P.D'}{D}$, and $P-\frac{P.D'}{D}$ becomes the force by which the air is impelled through the orifice at the end of the time t, or when the density is D′, and the velocities being proportional to the square roots of the forces, we have the velocity at the end of the time t equal to $\sqrt{\left\{2gh\left(1-\frac{D'}{D}\right)\right\}}$; this being multiplied by the density, by the area of the orifice, and by dt, gives $A\sqrt{\{2ghD(D-D')\}}dt$ for the small quantity of air which, during the element dt of time, and at the end of the time t, flows into the vessel. The velocities being constant, the quantities that flow during the time dt are equal to one another; hence, equating this expression with VdD' above, we get $dt=\frac{V}{A\sqrt{2ghD}}\,\frac{dD'}{\sqrt{(D-D')}}$. This equation being integrated gives $t=\frac{2V}{A\sqrt{2ghD}}(D-D')^{\frac{1}{2}}+const.$ The constant is determined by considering that $t=0$ when $D'=0$, which gives $const.=\sqrt{D}$, and thus the value of t is found.

It is shown under the word Air-Pump that the density of the air in a receiver becomes diminished in a geometrical progression, after successive strokes of the piston. Now the common ratio of this progression may be expressed algebraically by the term $\frac{v}{v+v'}$, where v is the volume of the receiver, and v' that of the barrel; and, if D be the density of the air in the receiver when the process of exhaustion is commenced, we shall have evidently $D\,\frac{v^n}{(v+v')^n}$ for the density of the air in the receiver after n strokes. Hence this density can be found when the number of strokes is given; or, reducing the equation, we may find n, the number of strokes which would be necessary in order to reduce the air in the receiver to any given density.

For the pressure and resistance of the air against bodies, see Aero-Dynamics and Gunnery; and for aerial navigation, see Balloon.

PNEUMOBRANCHIA'TA, Lamarck's second section of his order *Gasteropoda*, containing the *Limacinea*, or Snails.

PNEUMODERMON. [Pteropoda.]

PNEUMO'NIA. [Lungs, Diseases of.]

PNEUSTOI'DEA, Fitzinger's name for a family of Saurians, formed from *Lyriocephalus* and *Pneustes*, Merrem, and *Phrynocephalus*, Kaup. This family Fitzinger approximates to that of the Cameleons.

PO, BASIN OF THE. The river Po, called Padus and Eridanus by the Romans, rises from two springs, in about 44° 40′ N. lat., 7° E. long., on the eastern side of Mount Viso, a splendid mountain pyramid 12,580 feet high, the upper part of which is covered with perpetual snow. The sources of the Po are about 6000 feet above the sea. Flowing first east and then north-east, through a deep valley called Val d'Oro, the Po receives on its left bank the Chisone and other streams from the valleys of Pignerol and of the Valdenses; and on its right bank the Vraita, the Maira, and the Grana, which, rising in the recesses of the Maritime Alps, flow in a north-east direction through the open country of Saluzzo, and join the Po in succession above the town of Carignano, from whence the river flows nearly due north to Turin, through a broad valley bounded by the offsets of the Cottian Alps on the west and the hills of Monferrato on the east. Passing Turin, where it is crossed by a handsome stone bridge, the Po receives on its left bank the Dora Riparia from the valley of Susa and Mount Cenis, and afterwards the Stura from the valley of Lanzo, a romantic district among the Alps north-west of Turin. The river now inclines to the north-east, receives the Orca from the north, and passing by the town of Chivasso, turns to the east or east by south, in which general direction it continues to flow for the rest of its course to the sea, making however numerous windings. Below Chivasso the Po receives from the north the Dora Baltea, with all the drainage of the large valley of Aosta, and about thirty miles farther the Sesia, a considerable stream, which rises in the glaciers of Mount Rosa, and which, after draining the Val di Sesia, an Alpine valley, enters the plains of Vercelli, receives the Cervo and other streams, and after a course of about ninety miles enters the Po below the town of Casalè. The Po here makes a bend to the south, but on reaching Valenza resumes its eastern course. In all its course from Carignano to Valenza, for a length of nearly eighty miles, the Po receives no affluents of any importance on its right bank, being skirted all along on that side by the hills of Monferrato, owing to which the river describes a kind of semicircle. But to the south of those hills, and between them and the Ligurian Apennines, flows the Tanaro, a large stream which rises near Ormea in the Maritime Alps, and flowing northwards, receives the Ellero, Pesio, and Gesso, and the Stura from Cuneo (Stura is the name of several rivers of Piedmont), and after passing by Cherasco and Alba turns to the east, receiving the draining of the hills of Lower Monferrato on one side and of the Ligurian Apennines on the other. [Monferrato.] The Tanaro flows by Asti, the principal town of Monferrato, receives the Belbo from the south, and farther on the Bormida, swelled by the Orba from the mountains of La Bocchetta, after which it flows through the plains of Alessandria and Marengo, and enters the Po about eight miles below Valenza, after a tortuous course of about 150 miles, in which it describes a segment of a circle nearly parallel to that described by the Po, being separated from the latter river by the hills of Lower Monferrato.

After receiving the Tanaro, the Po continues its course in an easterly direction through the wide plain of Lombardy, receiving on its right or southern bank the Scrivia from Tortona and the Staffora from Voghera, and on its left or northern bank the Agogna and the Terdoppio from Novara. Between Voghera and Piacenza several offsets of the

Ligurian Apennines approach close to the southern bank of the Po, whose only affluent of any importance from that quarter is the Trebbia, a mountain torrent which swells greatly in the rainy season, but is shallow in time of drought. [Parma, Duchy of.] There is a marked difference between the character of the southern affluents of the Po east of the Tanaro and those which come from the north. The latter are deep perennial rivers, being fed by the glaciers of the Alps, but the others partake more of the nature of torrents, being chiefly supplied by the rains which fall in the Apennines. Napoleon remarks, in his 'Military Memoirs,' dictated to Montholon, that an army invading Italy from France finds its march much easier by following the southern instead of the northern bank of the Po.

The Ticino is one of the principal affluents of the Po. It issues out of several small lakes near the summit of the St. Gothard, flows through the Canton Ticino, and enters the Lake Maggiore, out of which it issues again at Sesto, from whence it flows for 60 miles through the great plain, marking the boundary between the Austrian and Sardinian territories. It passes by Pavia and enters the Po a few miles below that city. The Ticino is a very rapid river, but is navigable in the lower part of its course. East of the Ticino the Po receives the Lambro, swelled by the Olona, the river of Milan; and lower down the Adda, a deep and rapid stream, which is the outlet of the Lake of Como, and is swelled by the Brembo and the Serio from the mountains of Bergamo. [Adda.] East of the Adda runs the Oglio or Ollio, a considerable river, which rises in Valcamonica on the borders of the Valtelina, forms the little lake Iseo, and, issuing out of it at Sernico, receives the Mella from Brescia, and the Chiese, which is the outlet of the Lake of Idro, and enters the Po above Borgoforte. The Ollio is navigable by large boats below Pontevico. Its whole course, from its source to its confluence, is about 140 miles. [Brescia, Province of.] Proceeding to the eastward, the next great affluent of the Po is the Mincio, an important river, which is the outlet of the Lake of Garda, and with it forms a geographical division between the Milanese territory, or Lombardy Proper, and the old Venetian territories. The Mincio, after issuing out of the lake at Peschiera, forms the lagoons in the middle of which lies Mantova. Below Mantova it is navigable for large boats down to its confluence with the Po near Governolo.

The Po below Piacenza receives on its southern bank the following rivers, or rather torrents, which rise in the Apennines: 1, the Nura, a small stream; 2, the Taro, a larger river which rises in the mountains of Pontremoli, and after a course of about 65 miles enters the Po above Casal Maggiore; 3, the Parma and Lenza, two small streams in the state of Parma; 4, the Crostolo, a small stream which passes by Guastalla; 5, the Secchia, a considerable river which crosses the duchy of Modena, and enters the Po a few miles below the confluence of the Mincio. The Secchia is navigable for large boats up to Pontebasso near Modena [Modena, Duchy of]; 6, the Panaro, called Scoltenna in the upper part of its course, which rises at the foot of Mount Cimone near the frontiers of Tuscany, crosses the duchy of Modena and part of the papal province of Ferrara, and after a tortuous course of nearly 100 miles enters the Po below Bondeno. The Panaro is navigable for 30 miles above its confluence with the Po. The Panaro is the last affluent of the Po from the south; but on the north bank, below the confluence of the Mincio, various canals, under the names of Canal Bianco, Polesella, Tartaro, Adigetto, &c., bring into the Po part of the waters of the Adige, and the drainage of the marshy country which lies between the two rivers. [Adria.] The Po in former times passed south of Ferrara, but after the dreadful flood of 1152 the main stream changed its bed, and it now passes about three miles north of Ferrara. About twenty miles lower down, near Papozzo, the river divides into two branches; the left or northern one, which is the larger, is called Maestra, or Po Grande, and also Po delle Fornaci; it enters the sea by several mouths, the principal of which, called Maestra, is always navigable by merchant vessels. The length of course from the point of bifurcation to the mouth is about twenty miles. The right or southern branch, called Po d'Ariano, also divides into several mouths, the principal of which is called Po di Goro, and is likewise accessible to merchant vessels from the sea. The tide is only felt in a slight degree about seven or eight miles above the mouths, and it does not rise quite two feet. Small merchant vessels ascend the river as far as Lagoscuro near Ferrara. Higher up the navigation is carried on by boats of the burthen of sixty tons, as far as Cremona in all seasons, and higher up as far as Casale in Piedmont, except in times of great drought. Above Casale the Po is only navigable for small boats or rafts. The whole course of the river, including its windings, is reckoned at about 450 miles.

The width of the bed of the Po, from the confluence of the Ticino to its bifurcation, is from 1200 to 1800 feet. The depth of water varies from 12 to 36 feet. The periodical floods take place in the summer months, in consequence of the melting of the snows in the Alps, but extraordinary floods occur at other seasons also after great rains. From the confluence of the Ticino to its mouth, a distance of about 200 miles, the fall in the bed of the river is about 300 feet of perpendicular height. The Po is not fordable below Turin, and has no bridge across it below that city. The whole course of the Po with its sinuosities is above 400 miles. It is embanked from below Piacenza to the sea, to protect the country from inundations. The Etruscans are said to have first applied themselves to embank the Po. Near Ferrara, and below that town down to the æstuary of the Po, the ordinary level of the water in the river is higher than the country near its banks. (Reina, *L'Origine e Corso del Fiume Po*; Romani, *Dell' Antico Corso del Fiume Po.*) The old bed of the Po, which runs south of the town of Ferrara, and which is still called Po di Ferrara, still receives some of the water of the great river by means of canals, but is chiefly filled by the water of the Reno, a rapid river which rises in the Tuscan Apennines, passes near Bologna, and after a course of above 70 miles joins the Po of Ferrara below that city. The Reno is navigable for boats in the lower part of its course, but only in the winter and spring. The Po of Ferrara divides into two branches: the left or northern is called Po di Volano, from the name of the place where it enters the sea, the right or southern branch, called Po di Primaro, receives several rivers, or rather torrents, from the Tuscan Apennines, namely the Savena, Idice, Silora, Santerno, and Senio. The Po di Primaro enters the sea at Primaro a few miles north of Ravenna. The Lamone, which passes by Faenza, enters the sea by a separate mouth between Primaro and Ravenna. In antient times the Lamone communicated with the Po, and Ravenna itself stood on an island in the delta of that river. (Bertoldi, *Memorie del Po di Primaro*, Ferrara, 1785.) The delta of the Po may now be considered as terminating on the south at Primaro: it extends to the northward as far as the mouth of the Adige at Brondolo near Chioggia, distant from Primaro about 40 miles in a direct line from north to south; unless we consider the mouths of the Brenta and Bacchiglione as forming part of it, as those rivers are connected by canals with the Adige, and the Adige communicates with the Po. In this latter sense the delta of the Po would include all the sea-coast to the northern extremity of the lagoons of Venice, and the river Piave would form the northern boundary of the basin of the Po. The Piave, Livenza, Tagliamento, and Isonzo have each a small separate basin.

The length of the basin of the Po, from the sources of the Dora Riparia at the foot of Mount Genèvre, which is its most western point, to the great æstuary of the Po of Maestra, is 280 miles from west to east. The width of the basin is about 140 miles from the Ligurian and Tuscan Apennines to the Alps of Switzerland and of the Tyrol. The area, if we include in it the whole course of the Adige, is near 40,000 square miles, or about four-fifths of the area of England. The whole of Piedmont in its larger sense, Lombardy Proper, Southern or Italian Tyrol, the western half of the Venetian territory, the Swiss canton of Ticino, some districts of the canton of the Grisons, the duchies of Parma and Piacenza, the papal legations of Bologna, Ferrara, and Ravenna, and that small part of Tuscany which extends along the northern slope of the Apennines and is called Romagna Gran-Ducale—all these countries belong to the basin of the Po. The central part of the basin consists of a wide level plain, about 220 miles long and from 50 to 60 miles wide, the larger part of which lies on the northern side of the course of the river, and between it and the lowest offsets of the Alps. South of the river the hills of Monferrato and the Ligurian Apennines and those of Parma approach near to the bank, and rise rapidly above it, leaving only a small extent of plain between; but farther east, in the country of Modena, Bologna, and Ferrara, the

Apennines of Tuscany make a bend to the southward, leaving a level space of about 30 miles in width between their base and the bank of the Po. The plain or valley of the Po has a general slope from west to east in the direction of the course of the river. On each side of the valley the ground rises towards the Apennines on one side and the Alps on the other, but the slope is more gradual and gentle on the northern side. The town of Como, at the southern extremity of the lake of that name, and at the entrance of the great plain from the north, is 600 feet above the sea; Milan, which is half-way between Como and the Po, is about 400 feet; and Pavia, which is near the banks of the Po, is little more than 300 feet above the sea. The fertility of the plain of the Po is proverbial.

The remainder of the basin of the Po consists of the hilly region and the highlands. The hilly region, which is the most delightful part of the whole, forms a broad belt along the northern border of the great plain, and includes the lakes of Orta, Maggiore, Lugano, Como, Iseo, and Garda. South of the Po are the hills of Monferrato and the lower offsets of the Ligurian Apennines. The highlands are formed by the Alps on one side and the Apennines on the other. [Alps; Apennines.]

POA, the Greek name (πόα) for grass of any kind, is applied by botanists in a more limited sense, being restricted to those plants of the Graminaceous order which have a panicled inflorescence, many flowered spikelets, hermaphrodite normal flowers, a pair of glumes, and paleæ membranous at the point, without being inflated or provided with any kind of armature. Such grasses are abundant in Europe, the most common of all flowering plants being Poa annua, the little annual grass which springs up everywhere in the absence of the gardener, flowering and ripening its seed at all seasons when not actually frozen. It is probable that the perennial species are mostly suited for agricultural purposes, because they are destitute of the stiff hairs which render many grasses unpalatable to cattle. It is only the strongest growing kinds however that produce sufficient fodder to be profitable to the farmer, and among them the *Poa trivialis* and *pratensis*, two meadow species, are the most valuable.

POACHING. [Game Laws.]

POCILLO'PORA. [Madreporæa.]

POCKLINGTON. [Yorkshire.]

POCOCK, EDWARD, an eminent divine and learned Orientalist, was the son of the Rev. Edward Pocock, vicar of Chiveley in Berkshire. He was born at Oxford, in November, 1604, and received the early part of his education at the free-school of Thame. At the age of fourteen he was entered a commoner of Magdalen Hall. After two years' residence there, he was elected to a scholarship of Corpus Christi College, to which he removed in 1620. In November, 1622, he was admitted bachelor of arts. He now began to apply himself to the study of the Oriental languages, in which he made extraordinary progress, first under the tuition of Matthew Pasor, and afterwards under that of the Rev. William Bedwell, vicar of Tottenham, one of the first of those who have promoted the study of the Arabic language in Europe.

His first literary work was the preparation for the press of such parts as had not been edited of the Syriac New Testament, from a manuscript in the Bodleian library, to which he added a Latin translation and some notes: the whole was printed at Leyden in 1630, 4to. In 1629 Pocock was ordained priest, and soon after appointed chaplain to the English merchants at Aleppo, where he continued five or six years, making further progress in the Hebrew, Syriac, and Ethiopic languages, besides acquiring a familiar knowledge of the Arabic. On his return to England in 1636, he was admitted to the degree of bachelor of divinity, and soon after nominated first Professor of the Arabic lecture founded at Oxford by Archbishop Laud, with whom Pocock had maintained a correspondence during his stay at Aleppo, having been employed by that liberal prelate in collecting coins and MSS. for the university. He opened his lectures with an elegant Latin oration on the nature and utility of the Arabic tongue, part of which was afterwards published *ad calcem* 'Carmen Tograi,' edit. Oxon., 1661. Pocock however seems not to have delivered more than one course of lectures upon this occasion; for soon after, at the express desire of his patron Laud, he undertook a second voyage to the East, along with John Greaves [Greaves], and remained some time at Constantinople collecting antient manuscripts. After a stay of nearly four years in that city, he embarked in 1640, and returned home by way of France and Italy. While at Paris he became acquainted with many of the learned men of the time, and particularly with Gabriel Sionita, a Maronite well known by his Latin translation of Edrisi's 'Geography,' and other works [Edrisi], and with Hugo Grotius, to whom he communicated a design he had of translating his treatise 'De Veritate' into Arabic for the use of the Mohammedans. Grotius having approved of the plan, Pocock began his task, and the Arabic version was afterwards printed at Oxford, in 1660. [Grotius.] While at Paris, Pocock heard of the commotions in England, and on his arrival found his patron and benefactor, bishop Laud, a prisoner in the Tower. [Laud.] He now resumed his lectures and his private studies at Oxford. Having become acquainted with the celebrated Selden, who afterwards published part of the 'Annals' of Eutychius, in Latin and Arabic, under the title of 'Origines Alexandrinæ,' Pocock assisted him in collating and extracting passages from the Arabic MSS. in the Bodleian.

In 1643 Pocock was presented by his college to the rectory of Childrey in Berkshire, where he performed with the greatest zeal his duties of parish priest, visiting Oxford during term time. Immediately after the execution of Laud, the profits of his Arabic professorship were seized as part of that prelate's property, and he was reduced to his country living. In 1646 Pocock married the daughter of Thomas Burdett, Esq., of Hampshire, and in the following year he obtained, through the interest of his friend Selden, the restitution of his salary. In 1648 he was nominated to the Hebrew professorship at Oxford, to which Charles I., then a prisoner in the Isle of Wight, added a canonry in Christ Church, which was confirmed by parliament; but the canonry thus assigned to him being different from that originally annexed to the professorship, Pocock entered a protest against it, and refused to receive the profits. In the mean time he composed his 'Specimen Historiæ Arabum,' being extracts from the work of Abu-l-faraj, in the original Arabic, together with a Latin translation and copious notes. [Abulfaragius.] This work, which was printed at Oxford, in 1648 and 1650, 4to., was reprinted in 1806, by White, with some additions by Sylvestre de Sacy. In November, 1650, about a year after publishing the preceding work, Pocock was ejected from his canonry, and it was intended to deprive him of the Hebrew and Arabic professorships; but upon a petition from the heads of houses, the masters, and scholars at Oxford, Pocock was suffered to enjoy both places. In 1655 he was on the point of being deprived of his living, on the ground of 'ignorance and insufficiency;' at least such were the charges preferred against him by Cromwell's committee. Some of his Oxford friends however, particularly Dr. Owen, so warmly represented the disgrace which would follow the rejection, upon such grounds, of so eminent a scholar as Pocock, that the measure was abandoned. Soon after Pocock published his 'Porta Mosis,' being six prefatory discourses of Moses Maimonides's 'Commentary upon the Mishna,' written in Arabic, but with the Hebrew letters. This work, which was the first production of the Hebrew press at Oxford, appeared in 1655 (not 45, as printed by mistake in the article Maimonides), together with a Latin translation and numerous notes. In the following year Pocock appears to have entertained the idea of publishing the 'Expositions of Rabbi Tanchum on the Old Testament,' as he was at that time the only person in Europe who possessed any of the manuscripts of that learned Rabbi; but, probably from want of encouragement, he did not prosecute his design. In 1657 the English Polyglot appeared, in which Pocock had a considerable hand. He collated the Arabic Pentateuch, and also wrote a preface concerning the different Arabic versions of that part of the Bible, and the reason of the various readings to be found in them, the whole of which was inserted in the Appendix to the Polyglot. He also contributed greatly to the success of that literary undertaking by the loan of several valuable MSS. in his own collection. In 1658 his Latin translation of the 'Annals' of Eutychius was published at Oxford, in 2 vols. 4to., at the request and at the expense of Selden, who died before it appeared. At the Restoration, Pocock was restored (June, 1660) to his canonry of Christ Church, as originally annexed to the Hebrew professorship by Charles I. In the same year he was enabled, through the liberality of Mr. Boyle, to print his Arabic translation of Grotius's tract 'De Veritate.' His next publication, in 1661, was the Arabic poem by Abú Ismail Thograí, entitled 'Lámiyyatu-l-'ajem,' with a Latin translation, copious notes, and a learned preface by Dr. Samuel Clarke. But by far the most important as well as the most useful of Pocock's works was his translation of the entire work of Abu-l-faraj, which, along with the text and a few excellent notes, was printed at Oxford, in 1663, 2 vols. 4to. After the publication of this work he seems to have entirely devoted himself to biblical learning. In 1674 he published, at the expense of the university, his Arabic translation of the Church Catechism and the English Liturgy. In 1677 appeared his 'Commentary on the Prophecies of Micha and Malachi;' in 1685, that on Hosea, and in 1691, that of Joel. It was his intention to comment upon others of the lesser prophets. He died, September 10, 1691, after a gradual decay of his constitution, in the eighty-seventh year of his age.

Pocock had by his marriage with Miss Burdett nine children, the eldest of whom, named Edward, was also an Oriental scholar, and published in 1671, under his direction, the philosophical treatise of Ibn Tofayl, with a Latin translation and notes, under this title—'Philosophus Autodidactus, sive Epistola Abu Jaafar Ebn Tophail de Hai Ebn Yokdham,' the same which Ockley afterwards translated into English. [OCKLEY.] He also translated into Latin the work of Abda-l-latif on Egypt; but it was not printed until the beginning of the present century, when White published it with the original text, Oxford, 1800, 4to. [ABDALLATIF.] Another of Pocock's sons, named Thomas, translated into English the work entitled 'De Termino Vitæ' by Manasses Ben Israel, under this title — 'Of the Term of Life,' London, 1699, 12mo. An account of the life and writings of Pocock, the father, was published in 1740, by Leonard Twells, M.A., together with an edition of his Theological works, in 2 vols. folio.

POCOCKE, RICHARD, a distinguished traveller, distantly related to the preceding, though he added an *e* to his name, was born in 1704, at Southampton, where he was educated until he removed to Corpus Christi College in Oxford. In 1731 he took the degree of bachelor of laws, and two years afterwards that of Doctor. After travelling in the years 1734 and 1736 on the Continent, he sailed for Egypt, in which country he remained until the spring of 1738, when he embarked at Damietta for Palestine, and taking his road through Syria, Mesopotamia, Cyprus, Candia, and Asia Minor, arrived at Constantinople. From Cephalonia he sailed to Messina, whence he proceeded homewards through Italy, Germany, and Flanders. On his return in 1741 he published the result of his researches and observations, under the title of 'Description of the East and of some other Countries,' of which the first volume, entitled 'Observations on Egypt,' dedicated to Henry, Earl of Pembroke and Montgomery, appeared at London in 1743, folio; and the second, entitled 'Observations on Palestine, Syria, Mesopotamia, Cyprus, and Candia,' dedicated to Philip, Earl of Chesterfield, in 1745. In 1745 he was appointed archdeacon of Dublin, and in 1756 bishop of Ossory. He was subsequently transferred to Elphin, and lastly to Meath, where he died, in September, 1765.

Besides his 'Eastern Travels,' which are works of merit, Pococke made a tour in Scotland and published a description of the basaltic rock, in the harbour of Dunbar, resembling the Giant's Causeway. (*Phil. Trans.*, vol. 32, art. 17.) 'A Description of the Giant's Causeway,' and 'An Account of some Antiquities found in Ireland,' were also published by him in the 11th vol. of the 'Archæologia.' Among the MSS. in the British Museum (4811, 4827) are several volumes the gift of Bishop Pococke, containing the minutes and registers of the Philosophical Society of Dublin, from 1683 to 1707. A French translation of his travels appeared at Paris, in 1771, in seven volumes, in 12mo.

PODA'RCIS, Wagler's name for a genus of Lizards, part of which genus is placed, by MM. Duméril and Bibron, under the genus *Lacerta*, part under the genus *Acanthodactylus* of Fitzinger, and part under the genus *Eremias* of the last-named herpetologist.

PODARGUS. (Zoology.) [NIGHT-JARS, vol. ,xvi., p. 225.]

PODESTA. [LOMBARDY.]

PO'DICEPS. [DIVERS, vol. ix., p. 36.]

PODICEPSI'NÆ, Mr. G. R. Gray's second subfamily of the *Colymbidæ*. [DIVERS.] The first subfamily is *Colymbinæ*, consisting of the single genus *Colymbus*, Linn. (*Mergus*, Briss.; *Urinator*, Lacép.; *Eudytes*, Ill.).

The *Podicepsinæ* consist of two genera: 1, *Podiceps*, Lath. (*Colymbus*, Briss.); 2, *Sylbeocyclus*, Bonap. (*Colymbus*, Linn.; *Podiceps*, Ray; *Podilymbus*, Less.; *Dasyptilus*, Sw.).

PODILYMBUS. [PODICEPSINÆ.]

PODINE'MA, Wagler's name for a genus of *Monitory Lizards*, arranged by MM. Duméril and Bibron under their genus *Salvator*. [SALVATOR.]

PODLACHIA. [POLAND.]

PO'DOA, Illiger's name for a genus of Natatorial or Palmipede birds, *Heliornis* of Bonnaterre, *Grébifoulques* of Buffon. These have their feet lobated, like the *Foulques* (*Fulicæ*) and the *Grebes*, but their tail is more developed than in either, and their nails are sharper. Cuvier cites *Plotus Surinamensis*, Gmel., *Enl.*, 893; *Heliornis Senegalensis*, Vieill, *Gal.*, 280, as examples, and observes that M. Ch. Bonaparte (Prince of Musignano) considers, like Gmelin, that the genus should be approximated to the *Anhingas*. [PELECANIDÆ.]

PODOLIA, or KAMENETZ-PODOLSK, a government of European Russia, formerly a part of Poland, extends from 47° 25′ to 49° 45′ N. lat., and from 26° 20′ to 28° 50′ E. long. It is bounded on the north by Volhynia, on the north-east by Kiew, on the east and south-east by Kherson, on the south by Bessarabia, from which it is separated by the Dniester, and on the south and south-west by Austrian Galicia. The area is very differently stated by different writers. Hassel (in 1821) and Schubert (1835) make it 19,850 square miles; but Schmidtlin (1835) prefers the estimate of Marczynski, who makes it only 14,500 square miles. Podolia is generally a table-land of no great elevation, and is traversed by a branch of the Carpathians, which enters it from Galicia; but the most elevated parts of this chain are scarcely 500 feet above the level of the sea, and only heighten the picturesque beauties of this fine province. The south-eastern parts, which formerly belonged to the Ukraine, are sandy, and form a kind of steppe. The province is well watered. The Dniester, which is the principal river, flows indeed only along the frontier towards Bessarabia, but most of the small rivers run into it. The second principal river is the Bug. The Dniester is broad, but its course is rapid, and the navigation is rendered dangerous and difficult by numerous shallows, rocks, blocks of stone, and whirlpools. The same may be said of the Bug, which is obstructed by large blocks of stone, which however might easily be removed. There are numerous small meres in the western part of the province, but no large lakes.

The climate is mild and in general very healthy; there are scarcely any endemic disorders, except the Plica Polonica, which will probably remain endemic as long as the uncleanliness of the Russniaks and Poles continues. The soil of Podolia is proverbially fruitful, 'yielding a return,' says Hassel, 'which is scarcely equalled in Sicily. Wheat and rye often produce tenfold, and many kinds of grain 20, 50, and even 100 fold.' Schmidtlin however says 'the soil is extremely productive, but without yielding tenfold, as Hassel says, who uniformly exaggerates in this particular.' Besides all kinds of corn, hemp, flax, tobacco, and hops are cultivated. Agriculture is however practised in the most slovenly manner; the ground is scarcely scratched by the plough, it is never manured, and the same species of grain is often sown for several years together. Yet corn is so abundant, and of so little value, that, for want of demand, it has been often left to rot on the ground. The increasing exportation from Odessa has however caused a considerable improvement. The peasants have generally gardens, where they cultivate cabbages, onions, cucumbers, water-melons, and some fruit-trees, mostly apples, pears, cherries, and plumbs, but no great care is bestowed on them. The grass is remarkably luxuriant, and the forests are very extensive, but there is not much game in them; stags and deer are rare; in the fields and in the steppe between the Bug and the Dniester there are hares, wolves, foxes, a species of antelope, and bustards. Storks are very numerous. Swarms of locusts come periodically from the Black Sea. The breeding of cattle is very important; the oxen of Podolia are remarkably large and fine, and great droves of them are annually sent even to the middle of Germany. The race of horses is much esteemed. The sheep are of a good breed, and their wool is tolerably fine. Swine are very numerous. The farmers breed great quantities of domestic poultry and of bees. The fisheries are very productive. There is no metal except bog-iron. The other mineral products are saltpetre, stone for building, lime, gypsum, and alabaster. The manufactures are of very little importance, and not sufficient even for the supply of the inhabitants. There is hardly any wholesale trade in the province. What the farmer has to spare, such as corn, flour, hemp, flax, tobacco, timber, potashes, pitch, oxen, horses, tallow, wax, honey, &c., he sells to the Jews, who take the corn to Odessa, the oxen to Brody and Germany, and carry on a profitable contraband trade with Austria and Moldavia. Almost all the brandy distilleries, which are considerable, are in the hands of the Jews. Education is very limited. The schools are few in number, and Schmidtlin says he could not ascertain the number of scholars in the Roman Catholic, Greek, Jewish, Armenian, and other schools, and that there was but one printing-office (that of the government) in all Podolia. The greater part of the inhabitants are of the Greek religion. The Roman Catholics are numerous, as are also the Jews. There are some colonists, and some Greek and Armenian merchants. There are also a few gypsies. The population of this province has been variously stated, but it is probable that it amounts to at least 1,500,000.

The principal town is Kaminiec, the capital of the province, on the river Smotriza, at a short distance from its junction with the Dniester. It was formerly the most important fortress in Poland, but is now deprived of its fortifications; it consists of the upper town, of the lower, which is well built, and several suburbs. It has a very fine cathedral, a gymnasium, some manufactories and trade, and 16,000 inhabitants, half of whom are Jews. The other principal towns are the capitals of the circles (12 in all), but none of these are of great importance. Mohilew alone has 7000 inhabitants, a silk manufactory, and some trade. (Hassel; Cannabich; Schubert; Schmidtlin.)

PODOPHTHALMA, PODOPHTHALMIANS. Dr. Leach divided his *Podophthalma* into the two orders of *Brachyurous* and *Macrurous Crustaceans.* Latreille and Desmarest make the first order of the *Podophthalma*, the *Decapoda*, and the *Brachyura* and *Macrura* (*Brachyuri* and *Macrouri* of Latreille) families. M. Desmarest thus defines the *Podophthalma*:—

Composite eyes placed at the end of a moveable peduncle; no simple eyes; mandibles provided with a palp; jaw-feet always having a palp adhering to their base.

M. Milne Edwards makes the Podophthalmians the first legion of the subclass of *Maxillated Crustaceans*, and observes that the Crustaceans of which this grand division is composed present such multiplied analogies to each other, that it is impossible to refuse to unite them in the same group. This division, continues M. Milne Edwards, corresponds very nearly to Lamarck's order of *Crustacés Pédiocles* and to Dr. Leach's *Malacostraca Podophthalma;* but, in the opinion of M. Milne Edwards, it reposes on different bases, and can no longer preserve the limits assigned to it by those authors. We now proceed to lay before our readers the views of the last-named distinguished zoologist as to this great group.

M. Milne Edwards then observes, that the most remarkable trait of the organization of *Podophthalmians* consists in the disposition of the respiratory apparatus. In the other crustaceans it is the general envelope of the body or a portion of the thoracic or abdominal members which serves for respiration; but in the *Podophthalmians* this important function is nearly always entrusted to special organs which are not simple modifications of any of the ordinary appendages of the members. The existence of *branchiæ properly so called* is one of the most important characters of this natural group; but in some of the last Podophthalmians these organs become rudimentary, nay, even disappear completely, and are replaced by the general tegumentary envelope, as in the genera *Cynthia, Mysis*, and *Phyllosoma.* On the other hand, there are crustaceans which are provided with analogous organs, but which evidently do not belong to this tribe. Thus the females of *Jone* [ISOPODA] carry well-developed branchiæ fixed to the abdominal members: they are the only crustaceans actually known which, without belonging to the natural group of Podophthalmians, are provided with true branchiæ; and yet these organs do not exist in both sexes; the males have them not.

Another character, which is not wanting in any Podophthalmian, but which does not possess the same physiological importance, is furnished by the ophthalmic ring of the head, which is always provided with a pair of moveable members, at the extremity of which are found the eyes. But these are not the only crustaceans which have pedunculated and moveable eyes; the *Nebaliæ*, which undoubtedly belong to another group, are equally provided with them.

The buccal apparatus of the Podophthalmians is disposed for mastication, and is always composed of a labrum but little developed, of a pair of mandibles, and of one pair at least of jaws. The second pair of jaws enter also into the composition of the masticatory apparatus, and it is nearly the same with regard to the post-buccal members of the fourth pair; but these organs are never enlarged and united so as to constitute a kind of lower lip or buccal operculum, as it is seen in the *Edriophthalmians.* Finally, in the greater number of cases the two succeeding pairs of members are equally transformed into jaw-feet, and sometimes the number of these organs is even more considerable, for in certain species (the *Squillæ*, for example) all the thoracic members, with the exception of the last three pairs, may be regarded as such.

The thoracic members destined for locomotion are nearly always five or six pairs; their stem is always vergiform, and constitutes a slender foot, which is elongated and ordinarily ambulatory, sometimes carrying at the same time a *flagrum*, or else a palp, but hardly ever presenting at the same time two kinds of appendages. This mode of conformation of the locomotive organs clearly separates the Podophthalmians from all the crustaceans whose thoracic feet are lamellar, as the *Nebaliæ*, above alluded to, but is found in many other divisions of the class.

Finally, the animals of this legion may be distinguished at the first glance from all the other crustaceans by the existence of the great cephalic buckler which occupies the dorsal surface of the body, and extends more or less far below the thorax. Certain *Branchiopods* have also a similar carapace, but they then differ from the Podophthalmians by some of the characters of still greater importance already pointed out.

If the whole of their organization be taken as the basis of the classification of the *Crustacea*, as M. Milne Edwards states that he has attempted to do, the legion of Podophthalmians ought to be thus characterised:—

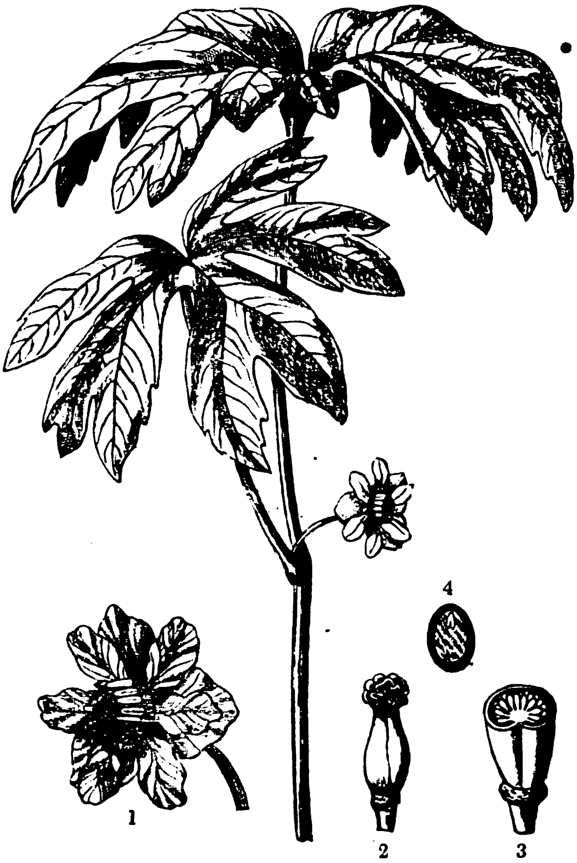
Mouth armed with mandibles and jaws proper for mastication; in general *branchiæ* properly so called; *eyes* pedunculated and moveable; thoracic *feet* vergiform; a *carapace.*

According to the system of M. Milne Edwards, the *Podophthalmians* form two orders, the *Decapods* and *Stomapods.* This division, he observes, is generally adopted, but the greater number of authors establish it on the number of thoracic members which constitute the locomotive apparatus; whilst, according to his rule, it is in the disposition of the respiratory apparatus that we ought to look for the principal bases. (*Histoire Naturelle des Crustacés.*)

PODOPHTHA'LMUS. [PORTUNIDÆ.]

PO'DOPHIS, Wiegmann's name for a genus of *Scincoidean Lizards*, belonging to the subdivision which have not the auditory apertures visible.

PODOPHY'LLEÆ, a small group of polypetalous Exogens, by some regarded as a distinct natural order, and by others referred to Ranunculaceæ as a section. They would be Papaveraceous plants if they had consolidated carpels; but possessing no more than one carpel, they appear more referrible to Ranunculaceæ, from which, in fact, they seem only to differ in having a solitary carpel, which however also occurs in that order, although not characteristic of it. The only species referred to Podophylleæ are Jeffersonia and Podophyllum, two North American plants, with succulent acrid root-stocks, deeply lobed leaves, and white flowers hidden among them. They have three or four sepals, twice as many petals, indefinite hypogynous stamens with linear or oval anthers, a thick sinuous stigma, and the ovules arranged along the central suture of the solitary carpel. Podophyllum peltatum, or May-apple, is not uncommon in gardens, whither it has been introduced from the United States, where it is employed as a safe and active cathartic.



Podophyllum peltatum.

1, a flower; 2, a carpel; 3, a transverse section of the same; 4, a vertical section of a seed.

PODOPSIS. [SPONDYLIDÆ.]

PODOSTEMMA'CEÆ, an obscure natural order of tropical submersed aquatic plants, with minute incomplete flowers. They appear to have no very obvious relation to any other natural group, and are little known even to botanists except by name. They however are certainly Exogens, and probably allied to Urticaceæ and Piperaceæ. Endlicher places them among his aquatic class, consisting of Ceratophylleæ, Callitrichineæ, and Podostemmeæ, and enumerates seven genera.

PŒCILONITTA, Mr. Eyton's name for a genus of Ducks (*Mareca*, Steph.; *Anas*, Linn.).

Example, *Pæcilonitta Bahamensis*.

PŒCILO'PODA, M. Latreille's name for his sixth order of Crustacea, and arranged by him under his second subclass, *Entomostraca*.

The following is M. Desmarest's character of the order:—

Head confounded with the trunk; a shell, or the anterior of the body in the form of a buckler; mouth in the shape of a beak, or composed of appendages which cannot be compared to mandibles; antennæ short and simple or null; often eyes distinct and sessile; anterior feet terminated by one or two hooks or by claws, fit either for walking or prehension; the posterior feet destined for natation, either composed of or accompanied by branchial laminæ, or membranous and digitated.

1st Division.

Mouth in form of a beak; antennæ to the number of four; twelve feet, of which the first two are in the form of acetabula, or suckers (ventouses). Family *Argulidæ*, Leach.

Argulus is the only genus of this division.

2nd Division.

Mouth in form of a beak; antennæ to the number of two only. Family *Caligidæ*, Leach.

These, says M. Desmarest, like the last, are crustaceous aquatic parasites: the greater part of them are marine, adhering to the branchiæ and the axillæ of fishes, having the antennæ inserted at the external angle of two lobes on the anterior surface of their shell, and the eyes most frequently not apparent.

1st Subdivision or Race.

Twelve feet; the six anterior terminated by hooks or unguiculated. Extremity of the abdomen furnished with two bristle-like appendages or oviferous tubes, which are cylindrical and elongated.

The genera arranged by M. Desmarest under this subdivision are *Anthosoma*, Leach (*Caligus*, Latr., Lam., Risso), and *Dichelestium* of Hermann the younger and authors.

2nd Subdivision or Race.

Fourteen feet; the six anterior unguiculated; the fourth or fifth pair bifid; the sixth and seventh having the haunches and the thighs very much dilated and united by pairs.

Cecrops, Leach, is the only genus placed by M. Desmarest under this subdivision.

3rd Subdivision or Race.

Fourteen feet; the six anterior unguiculated; all the others bifid.

The genera arranged under this subdivision are *Pandarus*, Leach (*Caligus*, Latr. and Lam.), and *Nogaus*, Leach.

4th Subdivision or Race.

Fourteen feet; the six anterior unguiculated; the fifth pair bifid, with the last joints ciliated with hairs.

Caligus, Müller [CALIGUS], and *Risculus*, Leach, are the genera arranged under this subdivision.

3rd Division.

Mouth with its aperture in the middle of five pairs of feet or jaw-feet, terminated in pincers, the haunches of which, rough with points, may serve for mastication; no antennæ; shell in the form of a buckler, consisting of two pieces, and terminated by a long sword-shaped tail; organs of respiration placed under the second piece of the shell. Family *Limulidæ*, Leach.

The genus *Limulus* (*Limulus*, Müll., Fabr., Lat., Leach; *Monoculus*, Linn.; *Xiphosura* and *Xiphotheca*, Gronov.; *Polyphemus*, Lam.; *Cancer*, Clus.) is the only one belonging to this division. [XIPHOSURIANS.]

See further SUCTORIAL CRUSTACEANS.

POELEMBURG, CORNELIUS, was born at Utrecht, in 1586, and studied painting under Abraham Bloemart. Having acquired considerable proficiency under him, he went to Rome, where the works of Raphael inspired him with a resolution to endeavour to imitate the grace of that great master, especially in the naked figure. But though he doubtless derived much advantage from the study of Raphael, he formed for himself a very different and entirely new style, not resembling that of any Italian master, unless it be in his adorning his landscapes with the ruins of antient buildings, which he designed with great accuracy after nature. He excelled all his contemporaries in the delicacy of his taste and the vividness of his colouring, as well as in the choice of his subject. The skies are clear, light, and transparent, and the magnificent remains of Roman edifices in his backgrounds give harmony to the whole composition. His female figures, which he generally represented naked, are distinguished by beauty and elegance of form. It has been objected that in some representations of nymphs bathing, he has chosen exposed situations by a roadside.

Poelemburg's works were highly esteemed in Italy, and some of the cardinals used to visit him while he was painting, to observe his manner of working. He left Rome with much regret, and returned to his own country. On the way he received many honours, at Florence from the grand-duke, and had great respect shown him in all the cities through which he passed, as well as in his native city of Utrecht. Soon after his return he was visited by Rubens, who expressed great pleasure in examining his works, of which he purchased several for his own collection, and bespoke others, by which he directed attention to the merit of Poelemburg, and advanced both his fortune and his reputation.

Poelemburg was invited by Charles I. to London, where he painted many fine pictures, for which he received large sums. The king wished him to stay in England; but his affection for his own country induced him to return to Utrecht, where he acquired a large fortune and was universally esteemed. Many eminent artists, especially Steenwyck and Kierings, got him to paint the figures in their works. The genuine pictures of Poelemburg are extremely scarce, but his disciple, Jean van der Lis, imitated his manner with such success that his paintings are often taken for works of his master. Dr. Waagen mentions the following works of Poelemburg in English collections:—at Corsham-house, the seat of lord Methuen, two landscapes with nymphs (to the most delicate touch is added extraordinary force and depth of tone); at Mr. Beckford's at Bath, a Repose in Egypt (a capital picture, of a larger size than usual with him, yet with all the delicacy of his smaller pictures), and very pretty little pictures with nymphs; at Burleigh-house, Christ and his two Disciples on the way to Emmaus (the usual delicacy of execution is here united with uncommon force); at Luton-house, a Repose in Egypt, of most delicately pure execution and soft warm harmony.

POETRY, in the usual and proper signification of the word, is applied to any composition in metre. It designates the outward form, not the style or the subject-matter treated. As however there are certain subjects, certain feelings and language, which belong to good poetry, a prose composition, in which these characteristics are visible, is often termed 'poetical' or 'poetry,' just as a bad poem is called 'prosaic.' In both instances we speak thus when we wish to express praise or blame, as the case may be, and we use the words metaphorically. (See Whately's *Rhetoric*, page 278.)

The art of poetry is an imitative art. Its object, in common with all such arts, is to give pleasure by imitation. So far music, painting, sculpture, and poetry agree; they differ in the means which each employs to effect the imitation. Music works by harmony and melody, painting by colour, sculpture by form, and poetry by words arranged in metre. In no case however is it the proper province of art to produce illusion, that is to say, the person whose feelings are to be affected always remains conscious that his emotion is not the result of anything really passing, but is merely analogous to that emotion which the reality would produce.

The imitative power of art thus consists in producing results resembling, but not identical with, those created by natural objects, or by human passion, character, and action. Hence the difference between a diorama and a picture, or between a waxwork figure and a statue: illusion is the aim of the one; imitation, properly so called, of the other. Hence too it is difficult to vindicate the mimicry of special sounds, such as hail or thunder, in music.

The metre in poetry answers a double purpose: in itself it affords pleasure by its rhythm, and acts as a powerful auxiliary to the sense which the mere words express; but above all, it preserves the essence of art by operating as a constant barrier against any approach to reality. In this way the poet avows the fact that his work is a work of art, and he makes the reader or hearer aware of the relation in which he and the author stand to each other. The imitative power may work in safety when hedged off from real life by the fence of metrical form, and thus it is that Wordsworth lays down the 'perception of similitude in dissimilitude' as one of the principles on which verse gives pleasure.

The next question is, in what mode does poetry imitate? Painting and sculpture copy outward forms themselves; poetry and music, being restricted to instruments of a different kind, aim at imitating the effect of those forms, that is to say, at producing the pleasurable emotion in the reader or the hearer, though in these cases they cannot imitate the means. On the other hand, the two former arts can only represent one moment of action or expression, and must tell their story by selecting that moment properly; music and poetry can supply a succession of images and sentiments all going to make up a whole. There is one advantage which poetry possesses over all its sister arts, viz. that of being able to assert: as it is the only art which employs words for its instruments, it is the only one which can enounce a proposition and command this element of the moral sublime.

Poetry, ποίησις, or 'making,' seems to be so called because good poetry creates or re-embodies the impressions which the poet has imbibed into his own mind by observation. This faculty of producing from such elements the impression of individual character, action, or scenery, is the power which we generally term imagination. Without it the attempt at imitation must necessarily fail. Wordsworth (Preface to 'Lyrical Ballads') says, 'Poetry is the spontaneous overflow of powerful feelings; it takes its origin from emotion recollected in tranquillity. The emotion is contemplated until by a species of reaction the tranquillity gradually disappears, and an emotion kindred to that which was before the subject of contemplation is gradually produced, and does itself actually exist in the mind.' This we take to be a description of the mode in which imagination works. The poet, by close and habitual observation, stores his mind with the circumstances which have given rise to or attended the production of emotion in himself. The result of this observation he works up so as to create in others an emotion kindred to that which he has himself experienced; kindred, but not identical, for, as Wordsworth truly remarks, the excitement must co-exist with an overbalance of pleasure. Now many of the emotions which the poet excites are, when called forth by real events, peculiarly painful. It is his business so to combine them with pleasing associations, so to soften their disgusting features and render prominent their more attractive ones, and above all so to give unity to the whole, that, taken with the consciousness of their existing in a work of art, and not in reality, they become a source of exquisite delight. Such a work is reality seen through the medium of the poet's mind, and clothed by him in a bodily form so as to retain its vividness, but lose its deformity.

It has been often observed that the language of savages is highly metaphorical and what is commonly called poetical; that nations in their earlier stage show a peculiar fondness and aptitude for poetry. The truth is that there exists in the mind of man a natural craving for individuality. We gain knowledge by generalising from individual objects, and we are always eager to re-embody our abstractions. Even in the most civilised state, there is a perpetual tendency in the mass of mankind towards 'realism,' while the consistent and familiar use of abstract terms and symbols implies long and severe discipline of the reasoning powers. These feelings are the groundwork of all allegory. If we reflect a moment, we know that 'justice' means that disposition of mind which we see exhibited by individuals who are called 'just,' yet we speak of her as if she were a real existing being, and paint her with a pair of scales and a sword. Thus the appetite for the imitative arts is one deeply implanted in man; he cannot be satisfied unless character or action lie embodied to the eye by colour and form, or brought vividly before the mind by the description of the poet. Abstract terms are indistinct, and require metaphors or similes to give them substance and make them palpable to the apprehension. One of the most wonderful phenomena connected with the Greeks is, that while the genius of the people constantly tended, as Mr. Thirlwall says, to embody the spiritual and personify the indefinite, they excelled no less in the dry and abstract studies of philosophy. If Homer, if Æschylus and Sophocles, have never been rivalled in poetry, it was Aristotle on the other hand who analysed with the greatest precision the process of human reasoning, and left us in his 'Ethics' and his 'Politics' treatises which are still instructive in their respective departments.

We must now proceed to say something of the diction of poetry. Words are the instruments of the poet; they are the tools with which he works. We think that Mr. Wordsworth pushes his theory of simple language a little too far. We fully sympathise with his rejection of 'those phrases and figures of speech which from father to son have long been regarded as the common inheritance of poets.' Such conventional forms of expression at last become adverse to the very object of all poetry; instead of conveying any definite or substantial image, they degenerate into mere formulæ of the vaguest and most unsatisfactory kind. But just as metre at once gives pleasure by its adaptation to the subject-matter, and forms a sort of framework in which the poet exhibits his composition to the reader, so may language, by its appropriateness and by its dissimilitude to the phraseology of common life, supply another twofold source of pleasure. There are ballads, and even larger compositions, in which the simple and homely diction suits the treatment of the subject and adds force and strength to the expression. But who will say that in such a work as the 'Agamemnon' of Æschylus, where the whole drama is knit together by one pervading feeling of mysterious dignity, the language should not bear a proportion to the other qualities of the work?

'Let gorgeous tragedy
In sceptered pall come sweeping by:'

stately and ornate diction is a part of her trappings.

We must next, as far as our limits will permit, consider the different moulds into which a subject may be cast by a poet, and according to which we call a poem epic, dramatic, lyric, &c. There is great difficulty in this part of our sub ject. The antients indeed applied such terms as 'epos' or 'elegeion' to the outward form only, but in modern language the matter of a poem, its length, or its mode of treatment, often decides the class to which it is commonly assigned. Moreover there are many works of a mixed character which we cannot place in any recognised division. To what genus do Dante's 'Divina Commedia,' Wordsworth's 'Excursion,' and Spenser's 'Fairy Queen' respectively belong? Certain broad distinctions may however be laid down, though they be incapable of definite application in every instance.

1. A poem may be in the form of a narrative of events which the poet professes to recount; although he sometimes introduces his heroes as speaking in the first person, and uses the historical present tense for the sake of greater energy, still the events are supposed to be *past*. The subject-matter is external, that is to say, the writer does not merely pour forth his own feelings as excited by certain actions or circumstances, but describes the actions or circumstances themselves. Of this kind is all epic and narrative poetry.

2. A poet may develop the action to the reader or supposed spectator by imagining that the personages of the story show its progress and their own characters by what they themselves say and do, not by what the author narrates of them. Here the time is supposed to be present, and the subject-matter still more purely external. Dramatic poetry, with all its numerous subdivisions, is of this kind.

3. The author may principally aim at expressing the overflow of his own emotions and his own sentiments, instead of narrating what is past or supposing something present to be acted before us. His object will then be to awaken an echo of similar feelings in the reader or hearer, and thus *imitate* the action of those impulses which have previously excited such feelings in his own mind. Most short compositions intended to be sung belong to this class. If the tone of thought is enthusiastic and the metre irregular, we call the work an ode; if it express tender or mournful feelings in a more regular form, it is an elegy; the name 'sonnet' marks the outward form only. Perhaps no general word can be found so applicable to the greater part of those compositions which are neither epic nor dramatic as the term 'lyrical,' though it does not seem in any usual sense to include epigram, satire, or didactic poems.

1. Epic poetry. It is a most curious fact in the history of human culture, that the earliest existing epic poem should be still unquestionably the finest. In the mechanical arts each generation profits by the diligence of its forerunners, and builds on the foundation which it finds existing. Whatever has been achieved accumulates for the benefit of posterity. In the imaginative arts the case is wholly different: the sudden exuberance and sudden decay of excellence are equally unaccountable. Whether composed by one or by many individuals, the works which bear the name of Homer undoubtedly possess a certain unity of action, and are just as admirable for the touches of pathos and gentler feeling which they contain, as for the vigour and life which we might imagine likely to characterise the early period to which they belong. Speaking a dialect equally expressive in energy and softness, the Greek epic causes its narrative to dwell on every part of the subject more equally than is consistent with the condensed form and single crisis of the drama. Whether in the combat, the feast, or the sacrifice, Homer's heroes and the actions in which they are engaged pass before us in tranquil succession, like the figures on a bas-relief; while a tragedy of Sophocles may be said to stand out by itself with concentrated interest and sharply defined outline, like the Laocoon or any single group of sculpture. The verse too is admirably adapted to this spirit. The hexameters, unrestricted by any pauses at fixed intervals, and thus free from the point or sententiousness of the later elegiac metre, flow on in an unbroken stream, accommodating themselves to the tone of thought and the subject-matter. At the same time they are less colloquial than the trimeter iambic of the drama.

To Homer succeeded a number of epic poets, most of whom wrote on the subjects contained in the so-called 'Cycle,' a word which seems to designate a collection of epic poems confined to a certain range, commencing with the union of heaven and earth, and ending with the latest adventures of Ulysses in Ithaca. The whole depended on Homer's so-called 'Trojan Cycle.' After the period of the Olympiads, the 'Cycle' seems to have declined, and for three centuries the great lyric poets were most conspicuous. Roman epic poetry, like most of the literature and civilization of that people, received its first impulse from Greece. Livius Andronicus and Cneius Nævius, who translated epic as well as dramatic poetry into Latin, were both probably Italian Greeks. Ennius too, the real founder of the Roman epos, was born at Rhudiæ in Calabria. It is probable that he first substituted the hexameter for the old Saturnian measure. No remains of Latin epic poetry between Ennius and Virgil have been preserved. In the latter author we find the reflexion of Greek poetry on the polished surface of the age of Augustus. Though exquisitely beautiful, the 'Æneid' is something almost entirely different in tone and spirit from Homer, and bears traces of its exotic growth, just as the Spanish poetry, after the time of Garcilasso de Vega, savours of Italian influence. The principal Latin epic poems after Virgil are the 'Pharsalia' of Lucan, the 'Argonautica of Valerius Flaccus, the 'Punica' of Silius Italicus, and the 'Thebais' of Statius. Some of Ovid's works, such as his 'Metamorphoses,' must be included in the general definition of epic poetry given above.

In modern poetry we find certain subjects which strongly remind us of the 'Cycle' in the mode in which they have furnished a constant set of themes for the poets of the middle ages. Such are the exploits of Arthur and Charlemagne, with their kindred legends. The cycle of Arthur was probably derived from the Celtic tribes, who seem to have sought in the exploits of their champion and the prospect of his restoration an indemnity for the sinking fortunes of their race. What they had lost in reality they made up in fiction, and communicated the interest in their own hero to the invaders who encroached on their borders.

The oldest Teutonic epic is the 'Nibelungen Lied.' It is composed in rhyming strophes of four lines each. The circle of tradition of which it treats was widely extended, and probably came from the north. The characters have a wild gigantic air, and the feeling of the poem, though the scene is laid in a Christian time and country, is, as Goethe has observed, purely heathen. There is no trace of any moral influence of religion. The 'Nibelungen Lied,' in its present form, was probably composed in the time of the Hohenstaufens, about 1200 A.D.

The poem of the 'Cid' is another remarkable monument of early modern epic poetry. Mr. Southey says, 'It is unquestionably the oldest poem in the Spanish language. In my judgment it is decidedly and beyond all comparison the finest.'

The mass of epic poetry existing in the Eastern languages seems very large. The most celebrated compositions of this class in Sanscrit are the 'Mahâbhârrata' and the 'Râmâyana.' Persian literature boasts the 'Shah Nâmeh' of Firdusi (who lived about 960-1030 A.D), in 60,000 verses. The 'Moallakât,' or collection of seven poems anterior to the time of Mohammed, of which 'Antar' is one, is said to be hung up in the Caaba of Mecca.

With the exception of our own Milton and of Camoens, the most celebrated modern epics are those of the Italian poets. The union of the classic and romantic elements in modern poetry began in Pulci, the friend of Lorenzo de' Medici (died 1487). To him succeeded Boiardo and Ariosto. The groundwork of their fictions was the cycle of Charlemagne as developed in the yet popular story-book the 'Reoli di Francia.' The coarseness and exaggeration of Pulci are softened down into exquisite irony and naïveté in Ariosto. In both writers there is somewhat of the same humorous feeling which in Cervantes formed the basis of 'Don Quixote.' Tasso imitated the antients most profusely, but he wove his imitations into an organic whole. His poem is composed with the utmost regularity, and appeals to the tender feelings and Christian sympathies of his age and country. The influence of the Italian poets on our own literature in the case of Spenser, Milton, and other writers, is most marked. In later times, in Germany, Klopstock followed in the footsteps of Milton. It is scarcely necessary to mention the 'Henriade.' Scott's poems have a strongly marked epic spirit. In Byron the morbid feeling of the individual is too often visible through the thin web of the story, and we miss much of the 'objective' character essential to epic and narrative poetry.

2. The analogous origin of the drama in antient and modern times is remarkable enough. In Greece it sprang from the religious ceremonies connected with the worship

of Bacchus: tragedy and comedy began respectively with the performers in the Dithyrambic and Phallic hymns. The modern drama arose out of the Mysteries of the middle ages, and in a single country of Europe the genius of the people caused it to retain its religious character to a very late period. The 'Autos Sacramentales' of Calderon, written at the end of the seventeenth century, at the court of the Spanish Bourbons, were genuine devotional ceremonies. The Ave Maria and the prayer on the stage were meant to be real, though the work in which they were introduced was professedly a fiction. It is rather difficult to ascertain what Aristotle meant when he said that 'tragedy effected the purification (κάθαρσιν) of the passions by means of fear and pity.' If we compare the passage in the eighth book of the 'Politics,' in which he uses the same expressions with reference to music, it will be clear that he did not mean, as has been supposed by some, the exercise of our passion on proper objects. We believe that he intended to describe that co-existence of excitement with an overbalance of pleasure to which we have already alluded. Fear and pity, when excited by the reality, do to a certain degree degrade or destroy the equilibrium of the mind: when properly appealed to by music or poetry, they cease to stagnate, and are at the same time 'purified' of all noxious and painful action; they are exercised consistently with the supremacy of reason and the enjoyment of pleasure by the individual himself.

The question of the unities in the drama is closely connected with that of illusion referred to above in its relation to art in general. There can be no doubt but that unity of action is essential, but that Aristotle rigidly prescribes the unities of time and place is untrue, and inconclusive if it were true. To turn a representation of three hours into a whole day is a contradiction of reality differing only in degree from imagining the same space to represent a lapse of years; but the fact is that illusion, or the notion that the action is a real one, is not to be aimed at. The imitation must in the ordinary drama be *probable*, or it ceases to be imitation; but we make as it were a tacit bargain with the poet to waive the limits of time and space. We play at a game on certain conditions subject to which he is to compose, and we are to look on. Thus in different classes of the drama these conditions vary. In the antient comedy, in an opera where the slender thread of words merely guides the stream of music, in a masque such as 'Comus,' or in a pantomime, who asks for probability? The writer engages to transplant us into a new and strange world; that world must be *consistent with itself*, and the writer must possess sufficient power and imagination to carry us into the region which he professes to people. The French, having long resisted the natural freedom of the imagination, are now paying the penalty of artificial constraint by the extravagance of their romantic writers. The reader will find excellent remarks on dress, scenery, and acting, and their relation to the poetry of the drama, in some of Charles Lamb's 'Essays.'

The histories of Shakspere are a distinct class of dramatic composition; dramatic in their form, and possessing a dramatic interest and crisis, but resembling epic works in their episodical character. To deny them their own merit because they are not what is called 'the regular drama,' is like the one-sided exclusiveness of taste which despises a Gothic cathedral simply because it is not a Greek temple. The beautiful in art is not confined within such narrow limits.

In the antient tragedy there is generally a solemn and gloomy destiny hanging over the story from its commencement. Some old unexpiated crime weighs down the hero and his house; the highest qualities of the human soul are exhibited in his struggles with fate, until the whole closes in darkness and destruction. The chorus was a peculiar feature, rendering, it may be observed, all notion of illusion doubly absurd. Its fate, Twining remarks, was curious; first it was all, then it was relieved by dialogue, then subordinate to dialogue, then digressive and unconnected with the subject of the play, for Aristotle observes that in Euripides it ceased to be part of the piece. In its proper application in tragedy, it was a lyrical accompaniment reflecting as it were the general impression of the whole work; a sort of abstract spectator, as Schlegel calls it (idealisirte zuschauer).

The works of Shakspere, and in a far less degree those of Calderon, have exercised enormous influence in modern Germany. Their renewed study in fact roused the spirit of rebellion which has completely burst the fetters of the French school of criticism, and inspired the dramatic genius of Schiller and Göthe.

3. We have already stated that the division of poetry given above is not put forth as exhaustive or complete. We cannot pretend, in the limits of this article, to discuss all the various forms of poetical composition which have prevailed, but we shall conclude by saying a few words on the subject of popular poetry and ballads.

There are few nations so rude as not to have attempted to clothe in verse of some sort, the feelings excited by the worship of their gods, and by the dangers of the chase and the battle, or who have not pretended thus to record the exploits of their heroes. It is probable that detached strains of this kind, recited or sung to music, have always preceded the connected efforts of epic poetry. These songs, familiarised by traditional recitation, would finally be worked into a sort of cycle, like the ballads of 'Robin Hood,' and might in certain cases become the basis of larger compositions.

Ballad poetry has attracted great attention from literary men during the last fifty years. The publication of Percy's 'Relics' in this country, though not absolutely the first attempt of the kind, roused the taste of Germany. Bürger translated many of the pieces contained in that collection. Herder's 'Volkslieder' gave an additional impulse to the study, and his masterly version of the ballads of the 'Cid' has become a German classic. The Germans repaid to us the debt which they owed for the first step; Bürger's 'Lenore' and his other works reacted on Scott. In the 'Border Minstrelsy' and the researches connected with it, a new field was opened, and Scott caught thoroughly the spirit of the old stirring songs which he took such pleasure in collecting and editing.

The Danes, the Germans, and the Sclavonian nations, especially the Servians, have a good deal of old popular poetry, but the two countries which are the richest in this department are Great Britain and Spain. Our own ballads are a sort of mixture of the epic and lyric compositions. The author sometimes expresses his own feelings; he does not narrate evenly and uninterruptedly, but springs as it were from one projecting point of the story to another, leaving to the imagination of the reader the task of filling up the intervals. Handed down for a long period by word of mouth, these ballads have suffered mutilation, and the later versions often vary much from the earlier ones, as may be seen, for instance, by comparing the two copies of 'Chevy Chase.' Sometimes a ballad composed for one event has been adapted to another; but on the whole, the remains which we still possess are most admirable.

The Spanish ballads are more epic in their character (we do not now speak of the Moorish ones). The lines generally terminate with an assonance instead of a complete rhyme, and they flow on in simple and strong narrative, sometimes tinged however with the national exaggeration. The principal subjects are the exploits of the peers of Charlemagne, the adventures of Bernardo del Carpio, the 'Chase of Roncesvalles,' the 'Infants of Lara,' but above all the history of the Cid and the later Moorish wars. The Spanish ballads are generally free from the gloomy supernatural machinery of northern nations. Ghosts and witches do not figure in them, as in English and Scotch popular poetry, though in one or two cases fairies occur The lighter compositions, 'coplas' and 'canciones,' are in their way just as beautiful, Some of the best seem to be fragments of old songs now lost.

Of the effect of popular poetry on the events of real life in times of revolution or disturbance it is unnecessary to speak. Those compositions which would seem to be the lightest and most trifling produce of the human imagination, are found in immediate contact with the sternest reality. Selden observes, 'More solid things do not show the complexion of the times so well as ballads and libels.' It is said that the old touching ballad of 'Ay de mi Alhama' was forbidden to be sung in the streets of Granada after the conquest. We have in Percy's collection the satirical ballad of 'Richard of Almaigne,' composed with reference to the war between Henry III. and his barons. Popular poetry played its part in contributing towards the Reformation. The absurdities and vices of the clergy were an inexhaustible theme at a later period. The song of 'Lillibulero' probably did much to facilitate the Revolution of 1688. Burnet (*Own Times*, iii. 336) says of it, 'Perhaps never had so slight a thing so great an effect.' The 'Marseillaise,' 'Ça ira,' and 'Tragala' played a still more prominent part in the bloodier convulsions of modern times.

PO'GGIO. [Bracciolini.]

POGGY ISLANDS. [Nassau Islands.]

POGO'NIAS. [Barbets.] Mr. Swainson makes the *Buccoinæ*, or *Barbuts*, a subfamily of the *Picidæ*, placing it after the *Picianæ*, at the end of the family. He characterises the *Buccoinæ* thus:—Bill surrounded with long bristles. Tail short, soft.

The following genera and subgenera are arranged by Mr. Swainson under this subfamily:—

Asthenurus, Sw. Bill short, compressed, very straight. Rictus smooth. Wings with the first three quills graduated. Tail moderate. Versatile and anterior toes nearly equal. Tropical America. (Sw.)

Example, *Asthenurus exilis*. *Pl. Col.*, 371, f. 2.

Picumnus, Temm. Habit of Asthenurus, but the rictus is bristled; the tail very short and not projecting beyond the wings. Tropical Asia. (Sw.)

Example, *Picumnus abnormis*. *Pl. Col.*, 371, f. 3.

Bucco, Linn. Bill straight, strong; the base very broad, dilated, and surrounded with long and very rigid bristles. Tarsus shorter than the versatile toe. The Old World. (Sw.) [Barbets.]

Subgenus *Micropogon*, Temm. General structure of *Bucco;* but the gape smooth. The first three quills only graduated. South America only. (Sw.)

Example, *Micropogon Cayennensis*. *Pl. Enl.*, 206, f. 1.

Genus *Pogonias*, Ill. General structure of *Bucco;* but the margin of the upper mandible distinctly toothed. Africa only. (Sw.)

Under a line of demarcation, Mr. Swainson adds the genera *Yunx*, Linn., and *Oxyrhynchus*, Temm. (*Classification of Birds.*)

Mr. G. R. Gray arranges the *Buccoinæ* as the first subfamily of the *Picidæ*, and makes it consist of the following genera:—*Pogonias*, Ill.; *Bucco*, Linn.; *Micropogon*, Temm.; *Polysticte*, Smith; and *Psilopogon*, Boie.

Pogonias is also Lacépède's name for a genus of Acanthopterygian fishes placed by Cuvier under his family *Sciænoides*.

POINCIA'NA ACULEA'TA, or the Barbadoes Flower-Fence, is a tropical leguminous bush, about ten feet high, with bipinnate leaves, obovate leaflets, prickly branches, large terminal corymbose masses of inflorescence, covered with showy yellow or red flowers, having singularly long stamens. It has acquired its name from having been used, on account of its prickly branches, as a material for hedges in the West Indies, for which however it is ill adapted, because its branches are not much subdivided, and are always naked next the root. It is among the most beautiful of plants, and is chiefly on that account cultivated in the West Indies, to which it was introduced from the East Indies, where it is common in gardens, flowering and seeding all the year round. The leaves when bruised have a smell of savin, and are said to have the power of bringing on abortion. They are well known to be purgative, and to have been used as a substitute for senna. According to Roxburgh, the trunk of this little tree or large shrub, when old, is constantly hollow, and occupied by a large red dark-brown ant. From this place, when disturbed, the ants issue in swarms, and inflict a severe and painful bite on their disturbers.

POINT, in music, the subject or theme of a fugue. [Fugue.]

POINT. [Solid, Surface, Line, Point, Definition of.]

POINT OF CONTRARY FLEXURE. By this term is understood a point at which a curve changes its curvature with respect to any given external point, being concave on one side and convex on the other. [See the figure in Curve for instances.]

The mathematical test of a point of contrary flexure in a plane curve is as follows. Let $y=\phi x$ be the equation of the curve, and let y'' be the second differential coefficient of y with respect to x. As long as y and y'' have the same sign, the curve presents its convexity to the axis of x, and when y and y'' have different signs, its concavity. When y'' changes sign, there is a point of contrary flexure, if y be then finite; and this, whether it passes through zero or infinity at the change. (*Library of Useful Knowledge*, 'Diff. Calc.,' pp. 369, 370.)

It is frequently stated in elementary works, that there is a point of contrary flexure when $y''=0$, and the converse. Both propositions are inaccurate; there is not necessarily such a point when $y''=0$, and there may be such a point when y'' is not nothing, but infinite. For the reasons which make this inaccuracy common, see Taylor's Theorem.

For example, let $y=x^2-\frac{1}{x}$, which gives $y''=2-\frac{2}{x^3}$. As long as x is less than 1, y'' is negative, and so is y, whence the curve is convex to the axis of x. When $x=1$, both y and y'' vanish, and when x is greater than 1, y and y'' are both positive, so that the curve is still convex. But there is a change of sign in y'' when x passes through 1; and therefore there is a point of contrary flexure when $x=1$. It is to be remembered that though at a point of contrary flexure the curve changes curvature with respect to any line not passing through the point, it preserves its curvature with respect to every line which does pass through the point, being on both sides convex, or on both sides concave, to that line. In the present instance, the curve is always convex to the axis of x; consequently, where it has a point of contrary flexure, it cuts that axis.

At every point of contrary flexure, the Tangent passes through the curve, and has a contact of an order different from that which it usually has. The radius of curvature at a point of contrary flexure is always either nothing or infinite.

Some English writers have copied the continental ones in calling it a point of *inflexion*.

POINT DE GALLE. [Ceylon.]

POINT WELLESLEY, Province of. [Penang.]

POINTER, a variety of the Dog used in shooting, and trained to stop and point where the game lies. This variety is the *Chien d'arrêt* of the French, and the *Canis familiaris avicularis* of Linnæus.

The old Spanish pointer was slow but very sure; and after all, where game is plentiful, there is as much or more to be picked up before one of these heavy but staunch dogs, now rarely to be found, as with the modern breed, in which swiftness is carried almost as far as it can be. Not that some of these thorough-bred fine-sterned dogs are not as staunch as any pointer of the old school, and there is something very delightful in their dashing style of ranging. A well-bred modern English pointer with a strong cross of the fox-hound, has perhaps as much 'travel' as can well be got out of four canine legs, and on light lands is of great endurance; whilst the true descendant of the perfect Spanish Pointer was rarely good for a second day's work. That the fine-sterned modern pointer is staunch, all who have seen high-bred and well-broken dogs act will allow; and it is recorded of Pluto and Juno, the two beauties which are immortalised in Daniel's 'Rural Sports,' that they kept their point while Gilpin took the sketch from which the picture was painted, upwards of an hour and a quarter. Steady enough this: but, on the other hand, though blood will do much, these well-bred fine-sterned dogs have been found when tried on the moors to be, though fast, not stout hunters, and unable to stand work and weather like some of their rougher brethren.

A treatise upon dog-breaking will hardly be expected here; but those who are interested in the subject will find it well treated in Daniel's 'Rural Sports,' 'The Sportsman's Cabinet,' Colonel Hawker's well-known and excellent work, and more particularly in 'Observations on Dog-Breaking,' by William Floyd, gamekeeper to Sir John Sebright, Bart., every word of which is worthy of the best attention. There are also many valuable hints in the 'Treatise on Shooting,' by the author of the 'Oakleigh Shooting Code,' in 'The Rod and the Gun.'

POISON. Separate articles having been devoted to nearly all the substances which are destructive to life when taken by accident or design, or when administered with a criminal intention, it will be necessary here only to consider the subject of poisons generally, referring to the articles Arsenic, Antimony, Copper, Mercury, Papaver, &c. for the details relating to each of them in particular. The whole subject may be conveniently and usefully treated by pointing out how in any case of legal investigation the proofs of poisoning may be established.

Omitting those things which are common to all cases of suicide or homicide, such as the previous circumstances of the person supposed to be poisoned, the conduct of the accused, and those, however important they may be, that are matters of common evidence, such as a number of persons who have partaken of the same meal being simultaneously and similarly affected, we propose to consider here only how in any individual case the influence of poison may be proved. The chief circumstances in the evidence will be, the symptoms presented during life; the examination of the body after death; the chemical analysis of the substances in which the poison may be mixed; and the experiments by which it is attempted to produce similar circumstances in animals by similar means.

The circumstances that usually first excite the suspicion of poison having been taken are, that the person affected is suddenly attacked by symptoms of severe illness, which come on soon after eating or drinking, without any premonitory indications, which regularly increase in severity without undergoing any important change in their character, and which rapidly prove fatal. All these however are far from affording sufficient evidence of poisoning. Suddenness of attack is common to many disorders, as cholera (whether ordinary or Asiatic), plague, perforating ulceration of the digestive canal, apoplexy, and epilepsy; and even in some cases of fever the premonitory symptoms are too slight to attract the attention of the patient. Any of these too may come on soon after taking food, and while the patient is apparently in the enjoyment of health; this is especially the case with cholera, perforation of the stomach, and apoplexy; and even in some diseases of the heart the patient may seem well up to the instant of the fatal, and often instantly fatal, seizure. The permanency and regular increase of the symptoms is not a more distinctive sign of poisoning. It is equally observed in many cases of the diseases already mentioned, as well as in most acute and uncontrolled inflammations, strangulation or other obstruction of the intestines, &c. Many of these diseases also may prove very rapidly fatal; apoplexy and certain diseases of the heart sometimes destroy life in a few seconds, and often in a few hours; in almost all cases of perforation of the digestive canal, and in some of cholera, death takes place in less than twelve hours.

In no case therefore can these, which are commonly stated as general symptoms of poisoning, excite more than suspicion; they may all have been produced by some spontaneously occurring disease. But on the other hand, the absence of any or all of them is not sufficient to disprove the suspicion of poisoning. Small and often repeated doses of poison may be given so as to produce all their symptoms and death very gradually; and the patient may in such a case exhibit numerous alternations of increase and moderation of the symptoms. Many circumstances will retard the action of even large doses of poison; if a person falls asleep soon after taking one, or if he has taken it with a large quantity of food, or much diluted, or partially neutralised, its symptoms may not be developed for some hours, and may seem quite unconnected with the last occasion of taking food. Or again, the poison may be administered in some other way than with food or medicine, as in the form of a vapour, by applications to the ulcerated skin, &c.

Dr. Christison divides poisons into three classes, irritants, narcotics, and narcotico-acrids. Each of these produce certain symptoms in addition to those already mentioned as belonging to poisons of all kinds, and certain morbid effects upon the organs of the body when it proves fatal, by which their action may in some cases be recognised.

The chief symptoms caused by the internal administration of irritant poisons are those of severe irritation of some or all parts of the alimentary canal. They commonly excite burning heat, redness and swelling and sometimes ulceration of the lining of the mouth, throat, and tongue; difficulty of swallowing, burning pain of the stomach with nausea and retching or vomiting, tenderness on pressure and tension of the upper part of the abdomen. The matters vomited consist, first, of the food or other contents of the stomach, and afterwards of tough mucus with more or less of blood and bile; the sickness is almost incessant, and is usually accompanied by severe suffering. The pain commonly extends from the stomach along a part or the whole of the digestive canal, with tenderness on pressure, and usually a constant and painful diarrhœa of mucus with more or less blood. The pulse is quick and feeble; there is great prostration of strength, excessive burning thirst, cold and damp skin, extreme anxiety of countenance and manner, and often considerable difficulty of breathing.

Many or all of these symptoms occur in al cases of poisoning by irritants, and many of them also in certain diseases, between which and poisoning it may be difficult to discriminate. Of these diseases the most important and deceptive are the acute affections of the digestive organs.

The most general effect of irritant poisoning is acute inflammation of the stomach, and it is therefore a question of the first importance whether that condition is ever produced by any other cause than the administration of poison. M. Louis and Dr. Abercrombie, whose authority is of the greatest weight in subjects of this kind, have never seen a case of idiopathic and primary acute gastritis; and it is certain that no well-established case of the kind has yet been recorded: the administration of an irritant poison may therefore be regarded as highly probable in any case in which a competent observer finds the signs of an acute inflammation of the stomach during life and its effects after death.

In such cases the principal evidence would depend on the appearances found in the dead body; in others the symptoms during life are equally important. Perhaps of all the diseases which give rise to the suspicion of irritant poisoning, the most frequent is cholera. There are however some circumstances by which they may be distinguished during life. In most cases of this kind of poisoning a burning sensation in the throat is perceived directly after the poison is taken, being the effect of its contact during or soon after the act of swallowing; the same symptom, when it occurs in cholera, appears to be produced by the contact of the substances vomited, and is therefore preceded by some of the other symptoms. In cholera the vomiting is never bloody, and is usually much more profuse than in cases of poisoning; and the cholera that occurs in this country is very rarely fatal in less than three days; while in most cases of poisoning, in which the symptoms are sudden and severe, death ensues in a few hours, or at least before the end of the third day. Asiatic cholera indeed is commonly more rapidly fatal; but it may be distinguished by the absence or late occurrence of the burning pain of the throat, by the absence of vomiting of blood, by the peculiar expression of the countenance and condition of the body, and by the suppression of all the secretions except the characteristic discharges from the stomach and intestines. [CHOLERA.]

The symptoms of common peritonitis and of common acute enteritis [PERITONITIS; ENTERITIS] can scarcely lead a competent witness of them to suspect that they arise from poisoning. But those of peritonitis from rupture or ulcerative perforation of any of the abdominal organs may closely resemble them, and render a diagnosis very ambiguous without the evidence of a post-mortem examination. Very severe cases of colic may also for a time simulate the effects of poison; but the frequent intermissions of their symptoms, the absence of both the local and the general signs of inflammation, and their rarely dangerous character or fatal termination, are sufficient signs of distinction. In the cases which have been called ileus, and regarded by some as merely examples of severe colic, there may be some doubt till the examination after death shows them to have resulted from an obstruction of the intestinal canal. [ILEUS.]

Other cases which are usually mentioned as simulating the effects of irritant poisoning, are those in which the stomach having been greatly distended by gluttonous feeding, death has occurred suddenly from apoplexy or some unknown influence; and those in which death occurs from drinking cold water while over-heated. In the former cases death, if not produced by distinct apoplexy, is preceded by symptoms more like those of narcotic than those of irritating poison; in the latter, the symptoms are very like those of common cholera, and are in the same respects different from those of poison.

It is evident from these circumstances, that in a fatal case of suspected poisoning by an irritant substance, it will seldom be possible to decide upon the evidence of the symptoms alone. When poison has actually been taken, the symptoms are sometimes so modified by circumstances peculiar to the case, that even where they have been carefully observed, much doubt has remained respecting their cause: and, on the other hand, the symptoms of naturally excited disease often too closely resemble those of poison to permit a positive conclusion being arrived at. Cases very rarely occur in which (unless other circumstances not connected with the condition of the patient after the seizure are conclusive) the evidence of post-mortem examination is not absolutely necessary.

The most general morbid appearances produced by the irritant poisons are either the destruction, by corrosion, of the tissues over which they pass, or some of the effects of acute inflammation in them. Of the latter, that which is the least decisive is the most common—redness. In the stomach, no kind or degree of merely vascular redness of the mucous membrane can alone certainly prove that it has been inflamed. The most intense redness is sometimes found where the person has had no gastric affection, and may be produced in any part of the stomach by the blood settling in its vessels after death, or being obstructed in them by suffocation. It is probable also that any very slight irritant, such as wine, given shortly before death, may produce considerable redness of the stomach. Small quantities of blood may also be effused between the lining of the stomach, from any of the causes which produce general diffused redness of the mucous membrane, by congestion of its vessels; but more considerable effusions of blood, especially when they appear as if incorporated with the tissue, and are of a brown or black colour, as if charred, are almost certain signs of poison. Any appearance of blackness, or of a dark brown discolouration of the stomach, as if from a chemical change in the blood filling its small vessels, is also a very suspicious, though not a certain sign. When redness of any part or of the whole of the lining of the stomach is accompanied by the secretion of a large quantity of tough mucus upon it, it may be deemed suspicious, but it is by no means a conclusive evidence of poison; it is more nearly so when the mucus is stained or streaked with blood. An effusion of lymph on the lining of the reddened or blackened stomach is decisive of inflammation; and of poisoning, if, as is most probable, acute inflammation of the stomach never arises from natural causes. The effusion of lymph however is not a common effect of poison, and tough mucus is often mistaken for it; they may be distinguished by the former being ropy, glaring, and transparent, the latter opaque, white, and deposited in a tender brittle membrane or in irregular flocculi. The softening of the mucous membrane of the stomach, and the ease with which it may be separated from the subjacent tissues, are signs of inflammation, when combined with an intense bright redness, or the effusion of much mucus or lymph; without coincident redness they are not to be depended on, since they may result from the digestion of the walls of the stomach, which sometimes takes place after death. An increase of thickness in the mucous and other membranes, by the effusion of serum beneath them, is a suspicious but far from a conclusive sign of acute inflammation.

The more serious changes resulting from poisons, such as ulcers and perforations of the stomach, differ according as they have been produced by the corroding power of the substance taken, or by the inflammation which it has excited. In the case of corroding substances, a principal sign by which their effects would be distinguished from ulcers which are the results of disease, is, that every part of the digestive canal with which poison has come in contact is affected at the same time, the lips, mouth, œsophagus, stomach, and even the intestines, all showing more or less of their influence; whereas it is very rare for diseases to affect more than one of these parts at a time. The appearance of an ulcer, or a perforation of the stomach, produced by corrosion, is also peculiar; it is commonly large and irregular; its edges are soft and pulpy, and usually black or brown, as if charred; and if the patient has survived only an hour or two, signs of acute inflammation will be seen in its neighbourhood, and in all the parts to which the corroding material has obtained access. Similar signs of acute inflammation are also always observed in the ulceration or perforation which sometimes, but very rarely, is produced by poisons that merely irritate the digestive canal; and these are a part of the signs by which those effects of poison are to be distinguished from perforations that occur naturally.

Ulceration and perforation of the stomach are so rarely the effect of merely irritant poison, and so commonly the effect of disease, that, unless there be signs of corrosion, they afford evidence against, rather than for, the suspicion of poison; and if there be no other evidence, and no attendant sign of recent acute inflammation, they may even be regarded as proofs that such a suspicion is incorrect. Of the forms of perforation of the stomach from other circumstances than poisoning, one of the most important is that in which, without any material alteration in the surrounding parts, one or more small ulcers form in the stomach, and becoming gradually deeper, at last, by a minute aperture, make their way through its walls, and permit its contents to escape slowly into the abdomen. These may be known at once to be the effects of disease, by the complete absence of any sign of inflammation in the lining or other tissue around them. Another form is accompanied with thickening of a considerable extent of the tissues adjacent to the ulcer, which is from a quarter to half an inch in diameter, and perforates by a large orifice, forming a hole with smooth edges, as if a piece of the stomach had been cut out by a sharp instrument. The thickening around the ulcer, which has all the characters of chronic inflammation, and the appearance of even a commencement of cicatrization, with the absence of all signs of acute disease of the stomach, are usually quite sufficient to distinguish this form of perforation. A third, which can scarcely give rise to doubt, is that consequent on cancerous or other malignant disease of the stomach. A fourth is that in which a portion of the walls of the stomach is dissolved or digested by the gastric juice after death; but whatever uncertainty there may be respecting the circumstances under which this singular effect is produced, there ought to be none in distinguishing it from the effects of poison.

From these statements it will appear that in some cases the symptoms and morbid appearances together may prove that irritating poison has been taken. The diseases in which the similarity of the symptoms is most embarrassing, as cholera and peritonitis, are those in which the morbid appearances are most distinct from perforation of the abdominal organs; while those more chronic inflammations of the stomach in which the morbid changes of structure are least decisive are those in which the symptoms admit of little doubt. This however cannot apply to all, though it may to the majority of cases. When death is produced slowly, the symptoms may be obscure, and the morbid changes very like those of disease: and still more difficult cases occur in which poison is taken by those who already suffered from disease of the stomach; or in similar individuals, deceptive appearances may be produced by the digestion and other changes in the stomach which occur after death. Cases of these kinds form a numerous class, in which the test of chemical examination, which indeed should be neglected in none, can alone be conclusive.

For this part of the subject however no general rules can be laid down. The detection of each poison must depend on the proper application of its appropriate tests; and these will be found in the several articles already referred to. [Arsenic, &c.]

The symptoms produced by the different narcotic poisons are more varied than those of the irritant class. The most common are giddiness, headache, obscurity or depravation of the sight, stupor or perfect insensibility, loss of power of the voluntary muscles, or convulsions of various kinds, and, towards the close, complete coma. To these the several species of narcotic poisons add effects peculiar to themselves; yet not so remarkable but that they are closely simulated by those of some naturally occurring diseases. The symptoms of apoplexy, for example, are almost exactly similar to those of poisoning by opium and the substances allied to it. In certain cases however the following circumstances may distinguish them. Apoplexy, though its actual attack is sudden (which the effects of opium are not), is often preceded by warning symptoms, such as headache, occasional giddiness, &c. If so severe as to simulate poisoning, it is not possible to arouse the patient from his stupor; but in poisoning with opium this may usually be effected to within a few hours of death; in apoplexy, convulsions often occur, in poisoning with opium, never; in the former the pupil is commonly dilated, in the latter contracted. Narcotic poisoning, if not fatal in twelve hours, is usually recovered from; apoplexy often terminates fatally after several days.

These distinctions will seldom serve further than to establish a very probable conclusion; and doubt may still remain in cases of this kind after a post-mortem examination. The evidence of poisoning afforded by it is commonly negative; the fullness of the vessels of the brain and the other slight differences from the appearances found in the average of healthy persons, that are commonly quoted as signs of the effects of narcotic poisons, are very unsatisfactory. It is probable that narcotics destroy by producing a kind of apoplexy; and in many cases the changes of structure to which they lead exactly resemble those of that disease, whether of those cases of it which are attended with effusion of blood in or upon the brain, or of those in which only the least possible alteration from the healthy structure can be detected. [Apoplexy.] Effusion of blood in the brain however is very rarely the effect of narcotic poisoning, and such an appearance would by itself afford strong evidence of apoplexy the result of disease.

The symptoms of epilepsy are often very like those of poisoning by prussic acid, and by some other narcotic and narcotico-acrid poisons, as belladonna, strychnia, &c. The following circumstances however distinguish epilepsy: the fit is often preceded by warnings; it almost always commences suddenly and violently; the patient cannot be roused from it: when fatal (which it very rarely is in a first attack), it is so only after several hours. In many cases the post-mortem examinations of epileptic patients detect no signs of disease; and in these there must always be some doubt, as this negative character is common to them and to narcotic poisoning. But in many, traces of old disease in the brain are found, which of course afford strong presumptive evidence that poison has not been taken. If a patient has died in a fit resembling those of epilepsy, and no morbid changes are found in his brain, poison must be strongly suspected, because it is very rare for such a fit, the result of disease, to terminate fatally, except in those whose brains are previously much diseased.

It is only necessary to allude to the difficulty that may at their first access exist, of distinguishing between the acute inflammatory diseases of the brain and those of the narcotico-acrid and some of the narcotic poisons. The true nature of the case is almost always evident after the first day of its duration; the poisoning is by that time terminated either by recovery or death; the disease continues its progress; and if the latter ends fatally, the morbid changes that it induces are sufficiently characteristic.

On the whole it must be concluded that the evidence afforded by symptoms and morbid appearances is less frequently conclusive in cases of poisoning by narcotics than in those where it is produced by irritants. The effects of the narcotico-acrids, which are compounded of those of the two other classes, are also in most cases as uncertain as those of the narcotics, and the difficulty with them is much increased by the present imperfection of the chemical tests of their presence in organic mixtures.

The evidence to be drawn from experiments with the substances supposed to contain the poison can rarely be needed, or be of much weight when obtained. In any case in which there is sufficient poison present to produce symptoms in any animal to which it is given, it ought to be discovered by the much more certain test of chemical analysis. This last, the evidence of chemistry, is certainly the least fallible of all; and in cases in which it can be applied, it is conclusive. These cases include the great majority of those of poisoning by irritants, and many of those by narcotics and narcotico-acrids; but in many of those by the two last classes, owing to the present imperfection of the tests for organic poisons, it is unavailing even in the most competent hands. In these also, as we have already shown, the evidence of symptoms and of the morbid appearances, is also often fallacious; and cases must frequently occur in which the evidence from all these sources together will not constitute a proof that poison has been taken. In the case of irritant poisons, on the other hand, the cases are few in which, from one or other of these kinds of evidence, their administration may not be satisfactorily proved.

We subjoin a list of the substances which should be administered in cases of poisoning, as early as possible after it has been swallowed.

Mineral acids (*sulphuric, muriatic, &c.*).—Chalk* or magnesia in water; soap and water, and afterwards milk and other diluents.

Alkalis (*soda and potash*).—Vinegar and water; almond or olive oil; any innocent acid with water.

Oxalic acid.—Large quantities of chalk or magnesia; afterwards milk and other mild fluids.

Arsenic.—Powerful emetics if vomiting has not commenced; large quantities of milk or some thick bland fluid, such as flour and water, or sugar and water.

Corrosive sublimate and other compounds of mercury.—White of eggs beaten up with water; decoction of bark or gall-nuts.

Blue vitriol and other compounds of copper.—White of eggs with water; sugar and water.

Antimony.—Large quantities of warm water or milk; decoction of bark or gall-nuts.

Nitrate of silver (*lunar caustic*).—Common salt and water

White vitriol and other compounds of zinc.—Milk; carbonate of soda in water.

Compounds of lead.—Emetics, sulphates or bi-carbonates of soda or potash in water; milk.

Laudanum and other preparations of opium.—Emetics; dashing of cold water on the face; strong coffee; forced exercise by constant walking.

Prussic acid.—Hartshorn, to be smelled and taken in small doses; chlorine; dashing with cold water.

Strychnine, and other vegetable alkalis.—Emetics; warm water; decoction of bark or of gall-nuts.

For other, as for many of these kinds of poison, it will always be right to excite copious vomiting, either by tickling the throat, or by giving a powerful emetic, such as from ten to twelve grains of sulphate of zinc (white vitriol), or the same quantity of powdered ipecacuan with one or two grains of tartarised antimony. The action of the emetic should be maintained till all the poison seems to be discharged, by repeated draughts of milk, or flour and water, or sugar and water, or some other bland fluid. For the subsequent treatment no general rules can be given.

POISSY. [Seine et Oise.]

POITIERS, a town in France, capital of the department of Vienne, on the river Clain, a feeder of the Vienne, 183 miles in a direct line south-west of Paris, or 214 miles by the road through Orléans, Blois, and Tours; 46° 36′ N. lat., 0° 20′ E. long.

This town was known to the Romans by the name of Limonum [Λίμωνον, Ptol.] or Lemonum (Cæsar) or Lemuno (*Tab. Peutinger*), and was the chief town of the Pictones, or Pictavi, a Celtic nation, whose name was, at a latter period, given to the city, whence the modern forms of Poitiers for the town, and Poitou for the province in which it is situated. The Pictones submitted to Cæsar at an early period of his command (Cæsar, *De Bell. Gall.*, lib. iii., c. 11), but afterwards sent eight thousand men to the general confederacy of the Gauls under Vercingetorix (B.C. 52). In the following year Duratius (B.C. 51), a chief of the Pictones, who with part of his countrymen had remained faithful to the Romans, was besieged in Limonum by the insurgent Gauls under Dumnacus, a chief of the Andes, or people of Anjou. The siege was raised by the approach of C. Caninius Rebilus, one of Cæsar's lieutenants, whose camp Dumnacus vainly attempted to storm; but the force of Caninius being insufficient to do more than repel the enemy from his camp, Dumnacus resumed the siege of Limonum, and was only driven from it by the approach of Fabius, another Roman officer, with a superior force. (Cæsar, *De Bell. Gall.*, lib. vii., 75; lib. viii., c. 26, seq.)

Upon the downfal of the Western empire, the city of the Pictones repeatedly suffered. It was pillaged (A.D. 410) by the Vandals; and subsequently came into the hands of the Visigoths, who extended their dominion over all the country south and west of the Loire. In the subsequent invasion of the Visigothic kingdom by Clovis, the vicinity of Poitiers was distinguished by the first of the three great contests that have rendered it the most remarkable battle-field of France. Alaric, king of the Visigoths, was defeated and killed by Clovis at Vouglé, which we take to be Vouillé, a village on the river Auzance, a few miles west of Poitiers. In A.D. 732, the suburbs of Poitiers were laid waste by the immense host of invading Saracens, under Abd-el-rahman; but the invaders were defeated by the Franks under Charles Martel, in the second of the engagements which have rendered the name of Poitiers memorable. The slaughter of the Moslems was great; but the victory was dearly bought, and Charles did not venture to pursue the retreating enemy. The tide of Mohammedan conquest was however checked, and western Europe was saved from the Mohammedan yoke. In the ninth century, Poitiers was pillaged by the Normans; it was at this time the chief town of an important county. [Poitou.] In the wars of the English in France, under Edward III. and his son Edward the Black Prince, Poitiers was the scene of the third memorable engagement. A body of above 2000 men-at-arms, and 2000 light infantry, partly English, but chiefly Gascons, and 4000 English archers, had advanced from Bordeaux, under the Black Prince and Sir John Chandos, almost to the

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* In any cases in which chalk is recommended, the plaster of the ceiling or walls of a room rubbed into powder and mixed pretty thickly with water may be used with equal advantage.

Loire. In their retreat, they were intercepted near Poitiers by the French army of about 50,000 fighting men under their king Jéan II. (A.D. 1356) and his four sons. The valour of Edward, the experience of Chandos, and the superior skill and efficiency of the English archery, obtained a complete victory. Jéan himself, his youngest son Philippe, thirteen counts, an archbishop, seventy barons or baronets, and two thousand men-at-arms were taken; and eleven thousand men, including a great number of nobles, fell in the battle or the pursuit. The English and Gascons lost nine hundred men-at-arms, and fifteen hundred archers. The courtesy of the Black Prince to his royal captive, which is vividly described by Froissart, won for him universal applause. The captivity of the king, a heavy sum for the ransom of the captive nobles, and an immense booty, constituted the only results of the victory; the conquerors returned to Bordeaux too much weakened for further operations, and anxious rather to secure what they had got, than to obtain further advantages. Poitiers was surrendered to the English by the treaty of Bretigny (A.D. 1360), but reverted to France by the voluntary surrender of the townsmen, in 1372, to Charles V., who, in consideration of this act, granted them great privileges. In the religious wars of the sixteenth century, the townsmen, who had chiefly embraced the Huguenot side, suffered much from the cruelty of the Roman Catholics, who besieged and took the town. Admiral Coligny afterwards endeavoured to retake it, but without success.

Poitiers stands on a stony hill, at the confluence of the rivers Boivre, or Bièvre, and Clain. It is surrounded by an antient wall, enclosing an oblong area of sufficient extent for a population of 80,000 or 100,000; but the area is now occupied more by gardens, paddocks, and meadows, than by houses. There are six gates, four of which are connected with as many bridges over the Clain. The streets are crooked, and wretchedly paved, and most of them steep. The squares are small, irregular, and mean, with scarcely an exception. The houses are of the most antient character, such as are seen in villages, without regularity, taste, or convenience. Yet, notwithstanding these drawbacks, the town, from the air of antiquity which pervades it, from its advantageous situation on the slope of a hill, and from the winding course of the two rivers, presents, when viewed from the adjacent eminences, a very picturesque appearance. The public walk called Le Parc de Blossac, on the banks of the Clain, commands a beautiful prospect, and the public buildings of the town are interesting from their antiquity, if not remarkable for beauty. Near the city, on the south side, there are some arches remaining of a Roman aqueduct, and in the town are the scanty ruins of a Roman amphitheatre. Some towers remain of the Gothic castle, which, in the middle ages, defended the place, and which are now converted into a depôt for gunpowder. The town-hall is an ancient building, but of no architectural pretension. The cathedral is very antient. It was commenced by Henri I. of France (A.D. 1042, 1060), and finished more than two centuries afterwards. The nave is wide, but not sufficiently lofty, supported on sixteen pillars, which separate it from the broad side-aisles, each nearly as high as the nave itself. The architecture is distinguished by simplicity and boldness; but the organ-loft is modern, and ill accords with the general character of the building. The rich treasures and numerous monuments of this church have disappeared. Another church, that of St. Jéan, is of great antiquity: it has been once a baptistery. The church of Sainte Radegonde is remarkable for its wide and handsome nave without pillars.

The population in 1831 was 23,128; in 1836, 22,000. Poitiers is not a place of much business. Common woollen cloth, coarse flannel, and blankets; cotton wicks for lamps and candles; hosiery, hats, and lace; leather, sheep-skins and goose-skins with the down on for trimming, are made or prepared, though not to any great extent. Considerable trade is carried on in trefoil and lucerne seed; corn, wine, wool, flax, hemp, honey, and wax. There are two weekly markets, and two, or according to other authorities, six fairs in the year. There are quarries of freestone in the neighbourhood. Poitiers is the seat of a Cour Royale and an Académie Universitaire, which have jurisdiction over a circuit comprehending the departments of Vienne, Charente suférieure, Deux Sèvres, and Vendée, and of a bishopric, the diocese of which includes the departments of Vienne and Deux Sèvres: the bishop is a suffragan of the archbishop of Bordeaux. There are a subordinate court of justice and a commercial court, several fiscal or administrative government offices, a chamber of manufactures, a society of agriculture, commerce, and arts; a faculty of law attached to the Académie Universitaire; a royal college with a cabinet of natural history attached to it; a diocesan seminary for the priesthood; secondary schools of medicine, surgery, and pharmacy, with a cabinet of natural history; a public library of 22,000 vols.; a free-school for drawing and architecture; a botanic garden, where lectures are given; a departmental nursery; several hospitals; a maternity society, and a theatre.

The arrondissement of Poitiers has an area of 760 square miles, and comprehends 82 communes. It is divided into ten cantons or districts, each under a justice of the peace. The population in 1831 was 94,770; in 1836 it was 95,059.

POITOU, a province and military government of France before the Revolution. It was bounded on the north by Anjou, on the north-east by Touraine, on the east by Berry and Marche, on the south-east by Limousin, on the south by Angoumois and Saintonge, on the south-west by the district of Aunis, on the west by the ocean, and on the north-west by Bretagne. Its form was irregular, extending in length 165 miles, from north-north-west to south-south-east, from the coast opposite the little island of Noirmoutier (which, with the Isle of Yeu, belonged to Poitou) to the neighbourhood of Rochechouart, and in breadth about 83 miles, from the banks of the Creuse, a little above its junction with the Vienne to Aunay near St. Jéan d'Angély. It was divided into Le Haut Poitou, or Upper Poitou, and Le Bas Poitou, or Lower Poitou; of which Poitiers (population 22,000) and Fontenay (population 7650) were respectively the chief towns. Le Haut Poitou comprehended the districts of Haut Poitou proper, Le Loudenais, Le Merebelais, Le Thouarsais, Le Niortais, or territories of Loudon (population 5032), Mirebeau, Thouars, and Niort (population 18,197); and La Gastine or Gâtine, of which Parthenay (population 4288) was the chief town. Poitou is now included in the departments of Vienne, Vendée, and Deux Sèvres. Some very small portions are included in the departments of Indre et Loire, Charente, and Haute Vienne. The population given above is that of the communes, and from the census of 1836.

Poitou was included by the Romans in the province of Aquitania Secunda, and from them it passed successively to the Visigoths and the Franks; and upon the dismemberment of the Frankish monarchy under the Merovingian and early Carlovingian princes, it was included in the kingdom or duchy of Aquitaine. Under Charlemagne (and indeed earlier) it constituted the county, or part of the county, of Poitiers; and in 845, by treaty between Charles le Chauve and his nephew and feudal subordinate Pepin, king of Aquitaine, the provinces of Poitou, Saintonge, and Angoumois were separated from that kingdom, and formed into what was termed the duchy of Aquitaine, as distinct from the kingdom so called. This duchy was conferred upon Rainulfe or Ramnulfe I., count of Auvergne and of Poitiers, and retained its separate existence when the kingdom of Aquitaine had been reunited to that of France. Rainulfe was mortally wounded near Le Mans, A.D. 867, in battle with the Northmen, or Normans, whose ravages were at this time at their height. He was succeeded in the county of Poitiers and duchy of Aquitaine by Bernard II., who was expelled by Louis le Bégue, king of France (A.D. 880), and succeeded by his son Rainulfe II. This count refused obedience to Eudes, who had usurped the throne of France (A.D. 887), and caused himself to be proclaimed king of Aquitaine; but he subsequently made up his quarrel with Eudes. He is said to have died from the effect of poison administered by the direction of Eudes (A.D. 893): and the county of Poitiers, after being contested by Adémar, or Aymar, and Robert, brother of King Eudes, came (A.D. 902) to Ebles the Bastard, a natural son of Rainulfe II. Ebles subsequently became duke of Aquitaine and count of Auvergne and of Limousin; but before his death (A.D. 832) he was despoiled of all his honours and dominions except the county of Poitiers, in which he was succeeded by his son Guillaume I., surnamed, from his abundance of light hair, Tête d'Etoupe ('head of tow'). Tête d'Etoupe was compelled for a time to share his county with Hugues le Grand, count of Paris; but having supported the king Louis IV. d'Outremer against Hugues, he succeeded by the king's grant in recovering the sole authority in his county, to which he added the county of Auvergne and the duchy of Guienne on the death of Raymond Pons, count of Toulouse, who had possessed these dignities. The lords of Guienne and the people of Auvergne however, being attached to the house of Toulouse, refused to acknowledge Guillaume, though Louis d'Outremer had invested him with the duchy; and Hugues le Grand, count of Paris, prevailed on Lothaire, who had just succeeded Louis, to grant the duchy to him. Hugues and Lothaire advanced with an army into Poitou, and laid siege to Poitiers (A.D. 955); but the siege was unsuccessful, though the invaders cut to pieces the army of Tête d'Etoupe, who attacked them on their retreat. Tête d'Etoupe ultimately succeeded in possessing himself of the counties of Auvergne and Le Velay, and of the duchy of Aquitaine, in which last, as well as in his county of Poitiers, he was succeeded (A.D. 963) by his son Guillaume II.

Guillaume II., surnamed Fier-à-bras (Fera brachia, or Ferox brachium) from his great strength, was obliged to cede Loudon and some other places to Geoffroi, count of Anjou, by whom he had been beaten in battle (A.D. 985). He refused to acknowledge the title of Hugues Capet to the crown; and in consequence Hugues invaded Poitou and laid siege to Poitiers (A.D. 988 or 990), but was obliged to raise the siege, and effected his retreat with some difficulty. Fier-à-bras made peace with Hugues Capet, and soon afterwards abdicated his honours and retired to a monastery, being succeeded by his son Guillaume III., surnamed Le Grand, to whom he is said to have bequeathed not only the county of Poitou and the duchy of Aquitaine, but likewise the counties of Limousin and Saintonge and the district of Aunis. Guillaume le Grand acquired by marriage, according to some authorities, the county of Marche, and extended his territories from the Atlantic to the Rhône. By a subsequent marriage he acquired the duchy of Gascogne; and, by a third marriage, allied himself to the house of Bourgogne. He was the most powerful of the French grandees of his time. The nobles of Italy offered him the crown of that country; but finding that the offer was by no means a unanimous one, he declined accepting it. He was held in high esteem by the princes of western Europe; and in a barbarous age was a cultivator and a patron of letters. On his abdication (A.D. 1029), his county of Poitiers and duchy of Aquitaine passed to his son Guillaume IV., surnamed Le Gras.

Guillaume le Gras was engaged in war with Geoffroi Martel, count of Vendôme, and afterwards of Anjou, who had married the widow of Guillaume le Grand, and pretended an hereditary right to the county of Saintonge. Geoffroi penetrated to Poitiers, the suburbs of which he burned; and having defeated Guillaume at Moncontour (A.D. 1034) and taken him prisoner, released him only on condition of his ceding the counties of Saintes and Bordeaux, and paying a ransom. Guillaume le Gras died A.D. 1038.

Eudes, son of Guillaume le Grand by his second wife, who had inherited from his mother the duchy of Gascogne, succeeded his half-brother Guillaume le Gras in the county of Poitiers and duchy of Aquitaine. He engaged in a war with Geoffroi Martel, in order to recover the counties of Bordeaux and Saintes, but was killed while besieging a castle in the district of Aunis. Guillaume V., surnamed Aigret and Le Hardi, a son of Guillaume le Grand by his third wife, succeeded Eudes in the county of Poitiers and duchy of Aquitaine (A.D. 1039), but not in the duchy of Gascogne, of which Bernard, count of Armagnac, possessed himself. He too was engaged in war with Geoffroi Martel: and was compelled to associate with himself in the duchy of Guienne his own brother Gui-Geoffroi, who had previously acquired the duchy of Gascogne by the expulsion of the count of Armagnac. On the death of Guillaume le Hardi, Gui-Geoffroi succeeded, and took the name of Guillaume VI. (A.D. 1058.) He united under his government a considerable portion of the south-west of France, and recovered the county of Saintes from the house of Anjou: the county of Bordeaux had been previously restored. He died A.D. 1086, and was succeeded by his son Guillaume VII., called Le Jeune.

Guillaume le Jeune assumed the title of count of Toulouse in right of his wife, who was daughter of Guillaume, brother and predecessor of Raymond, the reigning count, and, during the absence of Raymond, who was engaged in a crusade [LANGUEDOC], possessed himself of the county, which however he was afterwards induced to resign. Notwithstanding this failure, Guillaume retained great power: the counts of Angoulême, Périgord, Marche, and Auvergne were his vassals, and his accomplishments as a knight and poet increased the exaltation of his rank. His verses are the most antient of the extant poetry of the Troubadours, and attest the gross irregularities of the morals of that age, irregularities in which he himself largely participated. Seized with the devotion of the times, he set out for the Holy Land (A.D. 1101) at the head of an expedition of 140,000 men, who were followed by at least an equal number of women, children, and what Sismondi terms 'useless pilgrims.' This expedition was designed to strengthen the newly founded kingdom of Jerusalem, and comprehended among its leaders Anselme, archbishop of Milan; Guelph IV., duke of Bavaria; Hugues, count of Vermandois, brother of Philippe I. of France; Geoffroi, count of Vendôme; Etienne, count of Blois; Herpin, viscount of Bourges; Etienne, count of Bourgogne, or Franche Comté; and other nobles of France, Lombardy, and Southern Germany. But this immense host was diminished by the attacks of the Bulgarians, through whose territory it marched, and entirely destroyed in its progress through Asia Minor, very much through headstrong rashness and want of subordination. Guillaume le Jeune took refuge at Tarsus in Cilicia, from whence he proceeded to Antioch and Jerusalem. He returned to his dominions (A.D. 1103), and recorded his disastrous expedition in a poem now lost. The dissoluteness of his manners subsequently involved him in disputes with the church, and the restlessness of his disposition led him continually to engage in war. He conquered the county of Toulouse a second time (A.D. 1114), but his garrisons were driven out while he was in Spain with an army which contributed materially to the defeat of the Moors near Cordova (A.D. 1120). He afterwards engaged in a dispute with Louis VI. le Gros, in order to protect his vassal the count of Auvergne, whom the king had undertaken to chastise; but, alarmed at the force which the increasing power of the crown enabled Louis to raise, he hastened to make his submission (A.D. 1126). He died shortly after (A.D. 1127), as it appears of premature old age induced by his debaucheries. His son Guillaume succeeded him.

Guillaume VIII., though less debauched than his father, was as fond of war. He conquered part of the district of Aunis (A.D. 1130, seq.), and, in alliance with Geoffroi Plantagenet, count of Anjou, attacked Normandie. He died on a pilgrimage to S. Jago de Compostella in Spain (A.D. 1137), leaving his dominions to his eldest daughter Eléonore, who, after being married to (A.D. 1137) and repudiated by (A.D. 1152) Louis VII. le Jeune of France, was married, just two months after her divorce from Louis, to Henry Plantagenet, duke of Normandie, count of Anjou, and, in the sequel, king of England. The extensive territories which this marriage added to Henry's already considerable domains made him the most powerful prince of Western Europe. In 1169 he ceded Poitou, and the rest of the duchy of Aquitaine, to his eldest son Richard, afterwards Richard I. of England; but both Henry and Richard had to maintain frequent contests with their vassals, whom their own tyranny or that of their officers, or the intrigues of the French court, continually excited to rebel. The violent character and warlike spirit of Richard involved him in hostilities with the neighbouring grandees, with the French king, and ultimately with his own father Henry II. of England. After his return from the Holy Land, he granted the county of Poitiers and the duchy of Aquitaine (but not in full proprietorship) to his nephew Otton or Otho of Germany; from whom he afterwards repurchased them. On his death, the county and duchy reverted to his mother Eléonore, who was yet living, and who associated her son Jéan or John, king of England, with herself in these possessions. Otton, who appears never to have received the full amount for which Richard had agreed to purchase them, now reclaimed possession, but without success. Eléonore retained them almost, if not quite, till her death (A.D. 1203 or 1204). She had been attacked by her grandson Arthur of Bretagne, who claimed Poitou as part of his inheritance, but was defeated and taken by John at Mirebeau. Philippe Auguste, the ally of Arthur, shortly afterwards overran Poitou (A.D. 1204). Scarcely any resistance was made, and it is likely that the tyranny of Richard and the baseness of John had estranged the affections and allegiance of their vassals. Sismondi considers that the sentence of forfeiture of all his lands in France, which was pronounced against John by the court of peers of France, was subsequent to the conquest of Poitou, Normandie, and other of his territories; and that it merely gave a legal sanction to a conquest which had previously been achieved by force of arms. Thus fell the great county of Poitiers, the holders of which had played so important a part in the affairs of France.

Poitou was given by Louis IX. to his brother Alfonse, on whose death (A.D. 1271) the title of it was disputed between Philippe le Hardi, king of France, son of Louis IX., and Charles of Anjou, brother of Alfonse, and king of Naples. After a legal contest of many years, the county was adjudged to Philippe, who reunited it to the crown. Poitou was overrun by the English in the war of Edward the Black Prince in France (A.D. 1356), and was included in the principality of Aquitaine ceded by the treaty of Bretigny (A.D. 1360) in full sovereignty to Edward III. of England, who bestowed it on his son the Black Prince as a dependency of the English crown. [Bordeaux.] The defeat of the English fleet by the Castilians off Rochelle (A.D. 1372) enabled the French to reconquer Poitou. The duke of Berri and the constable Duguesclin broke into the province with their armies. Poitiers opened its gates, other places were taken by force, and Poitou finally reverted to the dominion of France (A.D. 1372). It was given by Charles V. to Jéan, duke of Berri, as an appanage; and afterwards by Charles VI. to his son Charles VII. when dauphin; but on his accession, it was reunited to the domains of the crown, from which it was never afterwards alienated. (*L'Art de vérifier les Dates;* Sismondi, *Hist. des Français.*)

POKE. [Phytolacca.]

POL, ST. [Pas de Calais.]

POLA, ANTIQUITIES OF. [Istria.] The most remarkable of the architectural remains at Pola is the amphitheatre. Though in its general plan and disposition it is nearly similar to all other edifices of the kind, it is marked by peculiarities. Like them, it is an ellipsis, and its transverse or greater axis, which runs nearly in the direction of north and south, is 436 English feet, while its lesser axis, or conjugate diameter, measures 346; consequently it falls short in size of the one at Verona, the dimensions of the latter being respectively 506 and 404 feet; yet is a trifle larger than that at Nismes, since the last does not exceed 430 by 337 feet. It is erected partly upon a rocky hill, on its eastern side, where there is only one tier of arcades, with another of square-headed openings or windows above, while the western side, or that facing the sea, has two tiers of arcades, besides an additional story beneath it, forming a series of square-headed doorways or entrances. In point of architecture it is still more remarkable, as exhibiting a specimen of that peculiar mode of bold rustic-work [Rustic] with deep channels (as well for the voussoirs of the arches as for the horizontal courses), which was afterwards so greatly affected by many of the Italian architects, and particularly those of the Florentine school; and it is further remarkable for the irregularity both of the depth of the courses of stone and of the size of the stones themselves, owing to which last circumstance their joints do not form exact *bond.* Yet in a work of such magnitude and massiveness this disregard of nice symmetry in that respect adds perhaps as much to the idea of rude strength as it detracts from finished elegance of workmanship. Both orders to the stories in arcades—if orders they can be called, for they consist only of pilasters, partly encased in the rustics of the piers, without any regular entablature, the architrave and frieze being supplied by horizontal courses of rustics—are Tuscan; and there are 72 arches in the circumference of each story, eight of which openings are placed in four projecting breaks, or *contreforts,* turned diagonally to the axes of the ellipse, and giving to the exterior a marked difference from that of other amphitheatres which are known to us. Only the external circumference is now standing, but that is nearly entire; the edifice therefore presents a fine appearance from the sea, on which side the extreme height from the ground is 101 feet, while on the east it does not exceed half that elevation.

Pola possessed also a theatre, but it is now known to us only in the rude sketches given of it by Serlio, in his work on architecture, the edifice itself having been destroyed for the sake of the materials, which were employed to construct the present citadel, upon the same site, in 1636. The other ancient monuments consist of the two temples, originally dedicated one to Rome and Augustus, the other to Diana; and the arch of Sergius. Both temples are placed upon the same line, about 70 feet apart from each other, which interval is now filled up by a range of very ordinary building; but whether they were originally connected, either by a colonnade or otherwise, so as to constitute one general architectural façade, cannot now be determined, although their relative position, and more especially their precise similarity both as to dimensions and design, would seem to favour such supposition. Only one of them however, that of Rome and Augustus, is comparatively entire, the other having been converted into a modern habitation. Although inconsiderable as to size, its external dimensions, including the portico, being no more than 62 feet by 31, it is remarkable for elegance of design and execution; and although it consists of a mere cella with a tetrastyle prostyle attached to it, the latter forms a bold projecting portico, it being diprostyle [Portico], that is, shows two open intercolumns on each flank, which is only one less than those in front. The order is Corinthian, elegant in its proportions and workmanship, with a frieze originally filled up by an inscription beneath the pediment, and decorated along the sides of the building by a rich Arabesque of foliage. One singularity in this example is, that while the shafts of the columns are quite plain, those of the antæ, or pilasters at the angles of the cella, are fluted with five channels on their faces, which is precisely the reverse of the practice of the Greeks; yet this does not seem to have been an architectural caprice, but adopted with the intention of thereby rendering the pilasters more distinct and more important features in the design; whereas insulated columns always arrest the eye, and detach themselves sufficiently from the rest. Much of the elegance of the design arises from the whole structure being raised upon a low unbroken stylobate with deep mouldings, which in front forms the pedestals enclosing the steps leading up to the portico; and it is rather singular that Palladio, who among others has professed to admire this structure, should not have discerned the superior propriety as well as beauty of such stylobate (the height of whose dado, or face, between its upper and lower mouldings, is even less than the diameter of a column), to those proportions which he has himself laid down for pedestals, and which become more offensive when such members are insulated, or else form projecting breaks, instead of a continuous podium, or footing on which the columns are raised.

Even the arch of Sergius, the other monument that remains to be spoken of, although by no means so pure in style and design as the preceding, exhibits lower proportions and greater solidity than usual in the pedestals to the columns. It has been conjectured that this arch, whose date is uncertain, and which now forms the south gate of the city, and is called the Porta Aurata, was intended rather as a private sepulchral structure in honour of the Sergii family, than as a public triumphal arch. The entire structure forms a façade about 28 feet wide by 36 high to the summit of the attic, pierced by a single arch (13 feet wide), on each side of which are two Corinthian columns with the entablature breaking over them, and standing upon a pedestal common to both. Unlike those of the Roman triumphal arches, these columns are not insulated, but each pair consists of engaged columns, the one next the archway being rather more than a semicircle in its plan, and the other, which forms the external angle, being attached to that angle only for one-sixth of its circumference. The archway itself is exceedingly shallow, not more than four feet in depth, consequently a mere opening in a wall, and not a passage through a mass of any depth; and that it was always thus is obvious enough, both from its construction and from there being columns in the other front, though these latter are only rudely sketched out, without having ever been finished. Yet although shallow, the inner part of the arch is very richly decorated, both in the soffit of its archivolt and the space between the impost and the bases of the columns, whose mouldings, as well as those of the pedestals, are continued through the arch.

For architectural delineations and details of these monuments we refer to the fourth volume of Stuart and Revett's 'Athens,' and to Allason's 'Pola' for tastefully executed pictorial representations of them.

POLAND. The comparatively small portion of the once powerful kingdom of the Jagellons, which, under the name of the Kingdom of Poland, forms an integral part of the Russian empire, is nearly of a quadrangular shape (exclusive of a long narrow tract of which we shall speak presently), and is situated between 50° 4′ and 55° 5′ N. lat., and between 17° 30′ and 24° 20′ E. long. The above-mentioned slip extends on the eastern side from 53° 20′ to 55° N. lat.: at the southern part this slip is scarcely 20 miles in breadth, and hardly anywhere exceeds 50 miles. The mean breadth of the southern quadrangular portion, from east to west, is above 200 miles, and its length from north to south about the same. The addition of the slip makes the whole length on the east about 360 miles. Its area, according to Hassel, is 46,000 square miles, but Cannabich and Hörschelmann make it about 50,000, which is the extent of England without Wales. It is bounded on the north by East and West Prussia, on the east and north-east by the Russian provinces of Wilna, Grodno, and Volhynia; on the south by Galicia and the republic of Cracow; and on the west by the Prussian provinces of Silesia and Posen.

Soil and Surface.—Though Poland is generally considered a perfect level, the surface exhibits considerable diversity, and some districts rise many hundred feet higher than others. The lowest and most level portion of the kingdom is situated between 51° 30′ and 52° 30′, where all the rivers run in an eastern or western and south-western direction, and even the Vistula changes its northern into a western course. The northern boundary of Poland runs over the southern declivity of that swell of high ground which must be considered as the southern limit of the plain of the Baltic, and which, beginning west of the western corner of that sea, and between it and the North Sea, extends eastward, at a varying distance from its shores, to the heights of Waldai and the source of the Wolga, into the centre of Russia. The most elevated parts of the surface of this tract are interspersed with numerous lakes, and some districts are literally dotted with them. Its mean elevation seems to vary between 300 and 500 feet above the level of the Baltic. Where it approaches the boundary-line of Poland it has been found to rise about 450 feet. It traverses the narrow and most northern part of Poland between 53° 40′ and 54° 30′. Its northern declivity, towards the Baltic, though gradual, is sufficient to carry off the abundance of water produced by the melting of the snow in spring, and these countries are accordingly in general well drained. Though the soil is sandy, the abundant moisture, by which it is saturated for a great part of the year, imparts to it a moderate degree of fertility, and it produces tolerable crops of rye, buckwheat, barley, and oats. The southern declivity of the swell is still more gentle. The river Bug in its western course is probably more than 300 feet above the sea-level, so that in a distance of more than 50 miles the country hardly descends 150 feet. Hence the rivers in many parts have a sluggish course, not being able to carry off the great supply of water in spring-time, and a considerable portion of the adjacent lowlands is not only inundated at that period, but several large tracts remain under water for the greatest part of the summer, and constitute extensive swamps. Such tracts occur especially along the rivers Bug, Narew, and Bobr; the last-mentioned river falls into the Narew. These low tracts, when drained, might probably be converted into meadows and fields, but some thousands of square miles are at present only used as pasture-ground for a few months, and are overgrown with shrubs and underwood. The more elevated tracts of this region have a sandy soil, but, when carefully cultivated, some parts give a moderate return; in others the soil is barren, and nearly without vegetation, except in spring, when there is a scanty grass. A large portion of this region is covered with woods; the most common tree is pine. Such is the country north of the Bug and the Vistula.

The most southern districts of Poland, the greater part of the provinces of Cracow and Sandomir, and that portion of Lublin which lies between the rivers Vistula and Wieprz, are hilly, and rise in some places to a considerable elevation. The surface of the Vistula above Sandomir is about 600 feet above the sea-level. At no great distance from the banks of the river the country rises with a steep ascent, and continues rising for some distance, until it has attained an elevation of more than 1000 feet, which may be considered the mean height of nearly the whole country between the Vistula and Pilica, with the exception of some tracts along the banks of the first-mentioned river. The highest part of this hilly region seems to traverse it from south-west to north-east, beginning north-west of the town of Cracow, where the small town of Olkusz is built on a hill whose summit is 1240 feet above the sea-level. From this place it runs to Kielce, to the east of which town, near the convent of Swieti Krzyz are two high summits, called Lysagora and Lyscycagora, which attain an elevation of between 1900 and 2100 feet above the sea-level. The country between the Vistula and Wieprz has a less elevation, though it is not less hilly. In the wide valleys of this hilly region the soil, though somewhat sandy, is of excellent quality, and yields good crops of excellent wheat, which is known by the name of Sandomir wheat, and fetches the highest price. On the west of the river Wieprz the country is level and contains only a few low hills. Near 51° 30′ N. lat. is the western extremity of that large region of swamps which forms the boundary between the rivers that run to the Baltic on one side and to the Black Sea on the other, and which extends in a north-north-east direction to the banks of the river Duna, occupying in some places more than a hundred miles in width. A very small portion of it lies west of the river Bug, and is included within Poland, as that river for a large part of its course constitutes the boundary-line between Poland and Russia.

The country which extends from the hilly region to the banks of the rivers Bug and Vistula, where they flow westward, and to the western boundary-line of Poland, may be considered level, as the highest ground, which runs in a south-eastern and north-western direction, hardly rises more than from 200 to 300 feet above the low tracts along the rivers, and the slopes are long and very gentle. The more elevated parts of these higher grounds contain large tracts of sand, nearly without vegetation: in other places they are covered with heath, and here and there some swamps occur, but they are not of great extent. The slopes have a more fertile soil, but even there the crops of rye and oats are scanty. In the vicinity of the rivers fertile tracts are numerous, especially on the low lands along their banks; but in some places these tracts are so low, that the soil is wet nearly all the year round, and they serve only as pasture-ground in the latter part of the summer and the beginning of the autumn. Such swampy tracts occur on the banks of the Vistula, but especially on the river Warta. Large tracts of this region are covered with forests, consisting mostly of coniferæ, especially pines.

Climate.—The range of the temperature is above 100 degrees in the course of the year. The summers are generally very hot, the thermometer rising to above 90°, when the south-eastern wind brings the heated air from the steppes of Astrakhan and other parts of Southern Russia; but these winds are not frequent, nor of long duration, and when succeeded by north-western winds, the thermometer in a few hours sinks 15°. The winters are very cold: the thermometer generally descends to 10° below zero, and sometimes, though not every year, to 15° and even 18°. The country is usually frozen and covered with snow for four or five months: the quantity of snow which falls annually is very considerable; it fertilises the sandy soil and renders it fit for the production of grain and grass. Though the weather in summer is generally steady, there are many rainy days interspersed among the fair weather; these rains invigorate the vegetation when it begins to suffer from the dry weather. Slight fogs occur in spring and autumn.

Rivers and Lakes.—The most considerable rivers are the Niemen and Vistula or Wisla [Niemen; Vistula], which are navigable for large river-barges as far as they drain Poland and flow along its boundary-lines. The number of affluents of the Vistula is considerable. It receives from the east the Wieprz and Bug, which latter river is joined several miles above its mouth by the Narew. The two last-mentioned rivers are navigable to a considerable distance; the Narew to the town of Lomza, and the Bug to Terespol, opposite the Russian town of Brzesc Litewski. From the west the Vistula receives the river Pilica, which is only navigable in the lower part of its course, and to no great distance from its mouth. The river Warta, an affluent of the Oder, begins to be navigable above Kolo, and the Prosna, an affluent of the Warta, above Kalisch. The last-mentioned river forms for the greater part of its course the boundary-line between Poland and Prussia. Lakes are frequent only in some districts. They are most numerous in the north-eastern district, but not of great extent. The largest are those of Augustowa, Duza, Wygri, and Nerza, but they hardly exceed two miles in length. The largest lake, that of Goplo, which is about 10 miles long, lies on the north-western boundary-line. The larger and wider part of it belongs to Prussia.

Productions.—Though Poland is not distinguished by fertility, it produces more grain, hemp, flax, and tobacco than are required for its consumption, and it exports these articles to other countries. Wheat is only abundant in the hilly southern region; the principal species of grain which are cultivated in the other parts of the kingdom are rye, oats, and buckwheat; barley is also raised, but less extensively. Leguminous vegetables are much valued, and their cultivation attended to. Other vegetables and culinary plants are found in the gardens of the nobility, but those of the poor peasant contain only potatoes, cabbages, and carrots. The orchards are much neglected; they consist mostly of cherry-trees, though pears, apples, plums, and walnuts succeed well. Horses and cattle are of inferior size, but rather numerous, and cattle, as well as hides and tallow, are articles of export. Hogs also are numerous, and bacon to a considerable amount is exported. Sheep and goats are less abundant, though some parts of the country are well adapted for sheep-walks; the wool is coarse, and little of it exported.

As a considerable part of the country is still covered with forests, timber constitutes an important article of export. The forests consist of oak, ash, lime-trees, and birch, but chiefly of pine and fir. Great quantities of timber from the large forests of the province of Plock, especially from the great one which surrounds the town of Ostrolenka, are annually floated, by means of the Narew and Bug, to the Vistula and to Danzig. They consist of about 20,000 trunks of pines and fir, and about 300 of oak. In those parts where the lime-trees are numerous the forests swarms with wild bees, and the excellent honey which is obtained from them is sent to the neighbouring countries. Wild animals are numerous, especially wolves, which annually destroy many sheep. Bears and lynxes have become rather rare, as well as the beaver, ermine, and elk; but deer, foxes, martens, polecats, badgers, and weasels are still very common.

Several metals and minerals are abundant in the hilly region. Silver-ore occurs in the province of Cracow, southwest of Kielce, but the mines are only worked on a small scale, and many of them are filled with water. Iron-ore is abundant, and considerable quantities are got out and smelted in the country about Olkusz and Kielce in Cracow, and about Konskie in Sandomir, where it is cast and exported in bars. Copper and lead occur, but do not appear to be worked. Calamine and zinc are more abundant. The largest part of the last-mentioned metal, which is imported into England, is brought from the southern districts of Poland. Very good marble is obtained from some hills near Checzin, south-west of Kielce. Rock-salt is abundant, though less so than in Galicia on the southern side of the Vistula. It is only in modern times that this salt has been worked in two or three places. There is also coal, but it is not much worked.

Divisions.—The kingdom of Poland is divided into eight provinces, which were formerly called waywodships, but by a decree of the emperor of Russia they are now called governments, like the provinces of the Russian empire.

1. Cracow is so called after the antient capital of Poland, which is now a separate independent republic. However, the greater part of the antient waywodship of Cracow is included in the government of Cracow. It lies between 50° 8′ and 51° N. lat., and between 19° and 21° 15′ E. long. It is bounded on the north-west by Kalisch, on the north-north-east by Sandomir, on the south by Galicia, on the south-west by the republic of Cracow, and on the west by Prussian Silesia. Its area, according to Hassel and Hörschelmann, is 4450 square miles· the population in 1831 was 425,000, and may now be 450,000. The Vistula separates it from Galicia: it is traversed by the Nida, and has in it the sources of the Pilica. It is one of the few Polish provinces that are traversed by a branch of the Carpathian mountains. There are some tracts of excellent land, good pasturage, forests, and valuable minerals, especially iron. It is divided into four circles, Kielce, Olkusz, Miechow, and Stobnica. Kielce, the chief town, is situated in a picturesque country surrounded by high mountains; it has an episcopal palace, four churches, a convent of Grey nuns, an ecclesiastical seminary, a lyceum, iron-works, and, in the neighbourhood, mines of iron, lead, copper, coals, and calamine. The population is stated by Hörschelmann (1833) and Cannabich (1836) to be 5000; but Hassel says it was 5000 in 1819, without the garrison. Among the other towns the principal are Pinczow on the Nida, which has 4176 inhabitants. Charles XII. of Sweden defeated the Poles and Saxons near this town in 1702. Chenciny, with a castle on a lofty hill, and lead and silver mines in the vicinity, has 2500 inhabitants. Slawkow on the river Biala has 2050 inhabitants.

2. Sandomir is situated between 50° 25′ and 51° 50′ N. lat., and between 19° 50′ and 22° E. long. It is bounded on the north-west by Masovia, on the north-east by Podlachia, on the east by Lublin, on the south-east by Galicia, on the south-west by Cracow, and on the west by Kalisch. Its area is 5900 square miles, and the population nearly 200,000. The Vistula divides in from Podlachia, Lublin, and Galicia; the Pilica, from Masovia and Kalisch. The face of the country is undulating, and there are here and there some mountains and forests, with tracts of very rich fertile soil. It is divided into the four circles of Sandomir, Opatow, Radom, and Opoczno. Radom, the chief town, on the river Radomka, has a Piarist college, a gymnasium, and 3500 inhabitants. Sandomir, on the Vistula opposite the mouth of the San, has above 3000 inhabitants It is a walled town, with six gates, and an antient castle on a steep rock, which was razed by the Swedes in 1656. There are here a collegium canonicorum, with a church, four convent churches, a synagogue, and a gymnasium. This town is celebrated in ecclesiastical history for the 'Consensus Sandomiriensis,' drawn up in 1570, by the Bohemian, Lutheran, and Calvinist clergy, and in the history of Poland, for the confederation of 1702. Opoczno on the Drzewica has an antient castle and 3500 inhabitants. Opatow on the Opatowka is situated in a fertile and pleasant country, has a cathedral and three other churches, a synagogue, and 2500 inhabitants, chiefly Jews, who carry on a considerable trade, particularly in Hungarian wines. Staszow is a well-built walled town on the Czarna, with a suburb. There are three Roman Catholic churches, a Lutheran Church, and a synagogue. It has above 3000 inhabitants, who have manufactures of cloth, woollens, and stockings.

3. Kalisch, which is the most westerly province of the kingdom, lies between 50° 40′ and 52° 35′ N. lat., and 17° 40′ and 20° E. long. It is bounded on the north and west by the grand-duchy of Posen, on the north-east by Masovia, on the south-east by Sandomir, on the south by Cracow, and on the south-west by Silesia. The area is 6740 square miles, divided into the five circles of Kalisch, Petrikau, Konin, Sieradz, and Wielun. Cannabich says that the population in 1831 was 614,594. This government has mountains in the south, and plains and forests in the north. The soil is in part sandy and swampy, but on the whole not unfruitful. The principal river is the Warta. Kalisch, the capital, one of the handsomest towns in Poland, is situated between two (Hassel says four, and Hörschelmann three) arms of the Prosna, in a marshy valley surrounded with hills. Most of the houses are built of stone, the streets broad and well paved, and some of them planted with trees. The population amounts to 15,000, of whom 2500 are Jews. There are two Roman Catholic parish churches, three hospital churches, one Lutheran church, a cathedral, and six convents. The most remarkable of the churches are the cathedral, dedicated to St. Joseph, and that of St. Nicholas. Among the public institutions are several schools, but the gymnasium and the military school for cadets have been abolished. Woollen cloth and linen are manufactured here, and there are several tanneries. The Swedish general Mardfeld was defeated and taken prisoner near this town by Augustus the Strong, elector of Saxony, on the 29th October, 1706. Petrikau is the seat of a court of appeal; it has seven Roman Catholic churches and a Lutheran church, a gymnasium, a handsome town-hall, and 4276 inhabitants. Konin on the Warta has a great manufactory of woollen cloth, and 3600 inhabitants. Sieradz on the Warta has 2650 inhabitants. Wielun has 3000 inhabitants, who manufacture some woollen cloth. New Czenstochau lies at the foot of the Klarenberg, on which there is a celebrated convent of St. Paul the Hermit, which was formerly fortified and furnished with heavy artillery, but is now dismantled. This convent possesses a miraculous image of the Virgin Mary, to which 40,000 pilgrims annually resort, with whom the inhabitants carry on a profitable trade in images, amulets, crosses, beads, &c. Old Czenstochau is about a mile distant from New Czenstochau, with which it is now connected by a new road, and both together have 5000 inhabitants.

4. Lublin. This government and its capital have been already described. [Lublin.]

5. Plock lies between 52° 15′ and 53° 30′ N. lat., and 18° 45′ and 22° 35′ E. long. On the south it is bounded by the Bug and the Vistula, on the east by the Drewenz; the Narew flows through it. In some parts there are tracts of the finest arable land and meadows, in others extensive forests and marshes. It is bounded on the north and west by Prussia, on the east by Augustowo, and on the south by Podlachia and Masovia. The area is variously stated; some writers making it 7400 square miles, others only 6300 or 6500. It is divided into the six circles of Plock, Pultusk, Lipno, Mlawa, Przasznitz, and Ostrolenka. The population in 1831 was 490,000. Plock is the capital. [Plock.]

Pultusk on the Narew is a bishop's see, and has a palace, a cathedral, three churches, several suppressed monasteries, a synagogue, and a gymnasium. The population is 3376. Wyszogrod on the Vistula has 3500 inhabitants, of whom 1500 are Jews. Modlin at the confluence of the Bug and the Vistula has always been a strong fortress, but since the unsuccessful Polish insurrection of 1829-30, the emperor of Russia has ordered the erection of a new fortress of the first rank, which is not yet completed. The other towns, even the capitals of the circles, are of no great importance.

6. Masovia is situated between 51° 30′ and 52° 55′ N. lat., and 18° and 22° E. long. It is bounded on the north by Plock, on the east and south-east by Podlachia, on the south by Sandomir, on the south-west by Kalisch, and on the north-west by the grand-duchy of Posen. Its area, according to Hassel and Hörschelmann, is 6760, but Cannabich makes it 7500 square miles. It is divided into seven circles, viz. Warsaw, Stanislawow, Sochaczew, Rawa, Lenczyc, Gostynin, and Cujavia. It lies on both sides of the Vistula, which flows through it, and has, on the whole, a rich fertile soil, which is well cultivated in the neighbourhood of the capital, and it also contains extensive forests. Warsaw is the capital. [Warsaw.] (The population of the following towns is given according to Cannabich, 1836. Hörschelmann, in 1833, makes the population much less, in many instances not half as much: he appears to have copied Hassel's work, published in 1821.) Lowicz on the Bzura has 6700 inhabitants, an antient castle, a cathedral, and three other Roman Catholic churches, a gymnasium, four convents, and a seminary for schoolmasters. The inhabitants are partly employed in the manufacture of linen and in bleaching wax. There are two annual horse and cattle fairs, where a great deal of business is done. Sochaczew on the Bzura has 2600 inhabitants; Rawa on the Rawka, 3189 inhabitants; and Lenczyc on the Ner, 2488 inhabitants. Tomaszow, a new manufacturing town at the confluence of the Wolborka and the Pilica, has important manufactures of woollens, cotton, and iron, a considerable trade, and 5000 inhabitants. Alexandrowo, a newly established manufacturing town, with manufactures of woollen cloths, has 3200 inhabitants. Ozockow on the Bzura has also manufactories of woollen cloth, and the population is said to be near 8000. Kutno is a flourishing town, with 4000 inhabitants.

7. Podlachia is situated between 51° 15′ and 52° 40′ N. lat., and 21° 10′ and 23° 40′ E. long. It is bounded on the north by Plock, on the east by Russia, on the south by Lublin, on the south-west by Sandomir, and on the west by Masovia. Its area is variously stated at 4800 and 5300 square miles. This province has the Bug running along the east and western frontiers, on the south-west the Vistula, and on the south the Wieprz; on the south-east there are numerous small lakes, and in the interior extensive marshes and forests; but it is otherwise a good agricultural country, rich in corn, pulse, cattle, honey, and wax; but a considerable portion is still in a very uncultivated state. It is divided into four circles, Siedlec, Lukow, Biala, and Radzyn. Siedlec, the capital, is a regularly built town, with a considerable palace and a beautiful park, several churches, a gymnasium, and 4420 inhabitants. Sokolow, Wingrow, Lukow, and Wlodawa have each above 3000 inhabitants. Kock on the Wieprz has an elegant town-hall, a beautiful church, a palace with grounds in the English style, and 2000 inhabitants. Biala on the Ina has a fine palace and park, and 3586 inhabitants. Miedzerzyce, a well built town on the Ina, has 4340 inhabitants.

8. Augustowo. This government, of which a description has been already given [Augustowo], lies between 52° 40′ and 55° 5′ N. lat., and 21° 25 and 24° 15′ E. long. It is divided into the five circles of Lomza, Augustowo, Seyny, Kalwary, and Mariopol. Suwalky, the capital, was founded about 70 years ago; it has handsome buildings broad regular streets, and 3000 inhabitants. Seyny, situated on a lake, has 2700 inhabitants. The absolution, which is given twice a year, brings together many thousand persons. Lomza on the Narew, in a woody country, has a Piarist college, a gymnasium, and 2300 inhabitants. Szczuczyn is a well-built town, with 3100 inhabitants. Wilkowyszki, in a very fruitful corn country, has 3000 inhabitants. Neustadt (*Nowemiasto*) at the conflux of the Schirwind and the Scheschuppe, surrounded by water on three sides, is on the Prussian frontier; it has much trade, and 3250 inhabitants. Kalwary, situated in a fruitful country, has 5500 inhabitants.

History.—The history of Poland previous to the introduction of Christianity is involved in darkness. The religion and political institutions of its inhabitants were similar to those of the other Slavonic nations, among whom the differences of dialect and manners which now distinguish the various branches of that race were at that time much less marked than they are at present. Christianity was introduced by the duke Mieczyslav, A.D. 965, after his marriage with a Bohemian princess. This event brought the Polish sovereign into close contact with the German empire, of which he became a member, having acknowledged the supremacy of the emperor, not over Poland, but over some provinces which now constitute a part of Lusatia and Silesia. He assisted in that quality at the diet of Quedlinburg, and took part in the wars of the empire. His successor Boleslav Chrobry, or the Brave (A.D. 992-1025), received (A.D. 1000) the royal crown from the emperor Otho III., who came to Poland on a pilgrimage to the shrine of St. Adelbert, and on that occasion declared him king of the Poles and Sclavonians. Thus the Emperor acknowledged his sovereignty over that numerous race, which then occupied all north-eastern Germany between the Baltic and the Elbe, and extended in many parts beyond that river. He also recognised his independence of the empire. Boleslav seems to have had in view the establishment of a Slavonian empire, and his successful wars in Bohemia, Germany, and Russia rendered the accomplishment of such a scheme not improbable. Boleslav not only considerably extended the frontiers of his kingdom, but strengthened it by wise regulations, and particularly by a skilful organization of the military force. The effects of the fortunate reign of Boleslav were marred by that of his son Mieczyslav II., a weak prince, who was entirely governed by his queen Rixa, a niece of the emperor Otho III. But things grew even worse after his death (A.D. 1034), during the minority of his son Casimir I. Rixa, to whom the government was entrusted, rendered herself so unpopular that she was obliged to retire with her son to Germany, and Poland was left to the horrors of anarchy, which lasted several years, until Casimir, being recalled by the principal inhabitants of the country, restored order. He governed the country with great wisdom, and was succeeded (A.D. 1058) by his son Boleslav II., surnamed the Dauntless, who was a skilful soldier and a man of chivalrous character. He restored two monarchs of Hungary, Bela and his son Geysa, as well as the duke of Bohemia, to their respective thrones, from which they had been driven by factions. He defeated the infidel Prussians, and when Tziaslaf, grand-duke of Russia, being expelled from his states, came to implore his assistance, he led him triumphantly back to his capital, Kiew. His residence of about a year in that rich town, which from its constant intercourse with Constantinople enjoyed the luxuries and refinements of Greece, proved unfavourable to his habits. The chroniclers say that his constant success and the great wealth which he acquired in his expeditions to Russia, made him overbearing, dissolute, cruel, and rapacious. He murdered Stanislav Szczepanowski, bishop of Cracow, who had remonstrated against his excesses, and being in consequence excommunicated, his subjects refused to pay him allegiance, and he was obliged to retire from the country, and he died in exile. The notices of some early chroniclers however favour the supposition that the murder of the bishop and its fatal consequences to Boleslav were the result of a factious opposition to his authority, headed by the principal nobles and clergy; and his popularity with the lower classes, which is admitted by the chroniclers, confirms such a supposition.

The vacant throne of Poland was occupied (A.D. 1082) by his brother Vladislav Herman, a weak monarch, whose reign was disturbed by foreign aggression and domestic war. Vladislav's son, Boleslav III., or the Wry-mouth, was a great monarch, who rendered his reign illustrious by many victories, particularly by one gained over the emperor Henry V. But the great glory of his reign was the conversion of the idolatrous Pomeranians. The effects of his fortunate reign were however entirely destroyed by his injudicious partition of the country among his four sons, a custom which was common at that time in many countries. This partition, by destroying the unity of the kingdom and producing internal wars, was productive of much mischief, and arrested the development of the Polish monarchy, which, being the most important Slavonic state, might have become a centre of unity for that race and for a Slavonian empire. Poland recovered from this state of weakness under Vladislav II., surnamed, on account of his short stature, the Cubit, who re-united (A.D. 1306) the dismembered provinces, with the exception of Mazovia, which however remained under the sovereignty of the kings of Poland, and Silesia, whose dukes had become lieges to the king of Bohemia. Vladislav was one of the greatest monarchs that ever governed Poland. He was educated in the school of adversity, having been twice driven from his throne into exile, and it was only on his last restoration that he succeeded in firmly establishing his authority. He exerted himself to settle the disturbed state of the country, to repel foreign aggression, and to curb the licence of the powerful vassals. He was crowned at Cracow, A.D. 1319, and thus restored a solemnity which had fallen into disuse since the death of Boleslav the Wry-mouth. His most formidable enemies were the Lithuanians, and the Teutonic order, whom Conrad, duke of Mazovia, called, about A.D. 1230, from the Holy Land to oppose the Prussian pagans, and granted them a large tract of land with many castles. These warrior monks, who subdued and partly exterminated the half-savage Prussians, soon became the most dangerous neighbours of Poland. Vladislav gained a great victory over them in the battle of Plowce, A.D. 1331. He was then seventy years of age: he died two years afterwards. But the most memorable event of his reign is the first diet of Poland, which he assembled at Chenciny a few months before the battle of Plowce.

The reign of his son Casimir the Great was devoted to the consolidation of the advantages gained by his father. He made great territorial concessions to Bohemia and the Teutonic order for the maintenance of peace, which was necessary to a kingdom that had so long laboured under the evils of war. The improvements which he made were great, and the chroniclers say that he found Poland built of wood and left it built of stone. He indeed rebuilt many ruined cities, and repeopled them with foreign settlers, whom he attracted by the grant of considerable privileges. His chief care was directed to the protection of agriculture: and the nobles, who were no longer permitted to oppress the peasants at their will, gave him the nickname of the Peasant King. The first code of laws was published in Poland by his orders at the assembly of Vislitza, A.D. 1347; and it was during his reign that the Russian principality of Halich was united with Poland. The good will of the inhabitants was secured by the concession of great privileges, and it remained a Polish province till 1772, when it was taken by Austria, and is now known by the name of Galicia. Casimir's great public qualities were unfortunately accompanied with great laxity of morals.

The antient dynasty of Piast,* which reigned in Poland from a date anterior to the introduction of Christianity, ended with Casimir's death, 1370. He was succeeded by his nephew Louis, king of Hungary. This monarch, who was descended from Charles of Anjou, brother to Louis IX. of France, merited the name of Great, which he received from his Hungarian subjects, but he had no right to claim such an appellation from the Poles. Engaged in continual wars with the powers of Italy, and particularly in the affairs of Joan of Naples, who had formerly been married to his brother Andrew, he entirely neglected Poland, which he visited only twice during his reign. But although he paid little attention to that country during his lifetime, he was very anxious to secure the throne to one of his daughters, an object which he accomplished by granting to the nobles, or equestrian order, many privileges, and by a considerable reduction of taxes, A.D. 1371. In consequence of this agreement, his youngest daughter, Hedvige, was proclaimed, after his death, queen of Poland, A.D. 1382, and was crowned at Cracow, being then only 15 years of age. The extraordinary beauty of that princess, which was united to the noblest qualities and the most exalted virtues, have rendered Hedvige's memory an object of national veneration. She married Jagellon, grand-duke of Lithuania, a pagan prince, who was baptised on that occasion, and converted to the Christian religion. [LITHUANIA.] This was a great sacrifice on the part of Hedvige, considering her attachment to William of Austria; to whom she was betrothed from her infant years. But this union effected the conversion of several millions of pagans, and changed a dangerous enemy into a permanent ally, for the accession of Jagellon to the throne of Poland completely united Lithuania with that country. Hedvige died A.D. 1399, but Jagellon, who on his baptism had received the name of Vladislav, continued on the throne till his death, A.D. 1434. His reign was made glorious by the victory of Grunwald, in which the power of the German knights was crushed by the united forces of Poland and Lithuania, though the advantages of this victory were lost by the irresolute character of the king. In Jagellon's reign, the Hussite tenets seem to have spread widely in Poland. The Hussites sent several embassies to Jagellon, and offered to him the throne of Bohemia; but although he might thus have united Bohemia with Poland, he had not resolution enough to accept the offer. He permitted however the princes of his house to assist the Hussites against the Roman Catholics. Jagellon was succeeded by his son Vladislav III., a prince eleven years old. He was scarcely of age when the Hungarians, threatened by the fast-spreading power of the Ottomans, invited him to their throne. The young monarch defeated the Turks (1443) in several battles, and advanced to within six days' march of Adrianople. The Mussulmans sued for peace, and it was concluded on terms most advantageous to the Christians. But this treaty was soon shamefully broken at the instigation of the pope: Cardinal Julian Cesarini absolved the king from his oath, and promised him aid from the Italian powers. The young Vladislav rushed headlong into a new and unjust war; but he was betrayed by the Italians, who, instead of assisting him, transported the Turks across the Hellespont into Europe to oppose him; and he perished at the battle of Varna, in the twenty-first year of his age. The death of the young king plunged Poland into a kind of stupor: the nation could hardly believe the reality of the melancholy news, and numerous reports were spread abroad of his still living as a pilgrim in distant countries. The throne remained vacant till 1445, when all hope of Vladislav's return having vanished, it was offered to his brother Casimir, grand-duke of Lithuania. Casimir was reluctant to accept the crown of Poland, preferring to govern his hereditary subjects the Lithuanians, whose nobles did not at that time enjoy the extensive privileges of the Polish equestrian order, and were less turbulent subjects than the Poles. However, when the states of Poland threatened to transfer their allegiance to a new sovereign, he accepted their offers, and left Lithuania, for which he preserved to the end of his life a strong predilection. The most important event of his reign was the union of the Prussian provinces with Poland. The inhabitants of that rich country, wearied of the oppression of the Teutonic order, declared themselves (1454) subjects of the crown of Poland. A war ensued, which was protracted by the incapacity of the king and by the internal discord which agitated Poland and Lithuania. It was terminated, A.D. 1462, by the peace of Thorn, which gave to Poland a rich and fertile country with a large population. The acquisition of Danzig proved particularly advantageous to the commerce of Poland. It was also under his reign that the representative system of Poland received a definite organization, A.D. 1468. It was determined that each district should elect representatives, and that these representatives should deliberate as a distinct body from the senate: thenceforward a measure became a law when it obtained the sanction of the king, the senate, and the chamber of nuncios, or representatives of the nobles, to which also the deputies of the towns were admitted.

The negligence of Casimir permitted the Tartars to make frequent inroads on the borders, and the Czar of Muscovy seized an extensive tract of Lithuania. Casimir was a great promoter of learning, and he gave a very superior education to his sons, having entrusted them to the care of the celebrated Italian scholar Philip Buonacorsi, better known under the name of Callimachus Experiens, who sought refuge at the court of Poland from the enmity of Pope Paul II. His eldest son, Vladislav, was called to the throne of Bohemia, in 1474, and in 1492 he became king of Hungary. Casimir died in 1492, and was succeeded on the throne of Poland by his second son John Albrecht, and by his third son Alexander in Lithuania.

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* A traditional or fabulous history of Poland relates that Mieczyslav's ancestor called Piast, who was a common peasant and wheelwright, was elected monarch on account of his great virtues and hospitality about the middle of the ninth century. Hence the name of Piast applied to the dynasty which ended in Poland in 1370, and continued in Silesia till 1675. Piast became afterwards in Poland a legal term applied to a king elected from the natives of the country.

John Albrecht was a warlike prince, but of a careless and indolent disposition. His tutor Callimachus had great influence over him, and advised him to check the overgrown power of the nobles, for which purpose he had drawn up a system of policy to be followed, but the report of these schemes only rendered the opposition of that class the stronger. Having inconsiderately engaged in an expedition against the Wallachians, Albrecht's army was surprised by the enemy and completely defeated. The Turks soon after invaded Poland with a considerable force, but they were almost entirely destroyed by an unusually severe winter. John Albrecht died in 1501, and his brother Alexander, grand-duke of Lithuania, was elected his successor.

Alexander's reign was unfortunate. His marriage with Helena, daughter of Ivan III., grand-duke of Moscow, and Sophia Palæologus, did not prevent his father-in-law from repeatedly invading the frontiers of Lithuania, and taking possession of several castles and districts in that country. The Tartars also committed great devastations in the same country, but they were defeated by his favourite, Prince Glinski, a short time before his death, in 1506. The royal power was much weakened under his reign by the extension of the privileges of the nobles.

After Alexander's death, his youngest brother Sigismund, duke of Troppau in Silesia, was elected king of Poland, having become by inheritance grand-duke of Lithuania. He found the affairs of both countries in a very unfavourable state. The southern provinces of the kingdom were converted into a desert by the repeated inroads of the Tartars, and even some parts of Lithuania had experienced the disastrous effects of their ravages. The czars of Muscovy, who were recently emancipated from their subjection to the Tartars, and had reduced and united with their dominions the principalities of Rezan and Tver, as well as the republics of Novogorod and Pskow, became by these important acquisitions very formidable neighbours to Poland. Though experience proved that the Muscovite armies were inferior to the Polish in courage and military skill, they always surpassed them in numbers. The resources of the Muscovite sovereign were immense; he ruled despotically over many rich and populous provinces; and his mandate was sufficient to call round his standard countless thousands. It was quite the reverse in Poland, where the turbulent nobility frequently and in the most wanton manner opposed the best views of the king, and often resisted his commands with no other view than to assert their own rights, an encroachment upon which they dreaded more than any foreign aggression. It is true that the warriors who generally flocked to the royal standard were the bravest of the brave, but their numbers were few, and though they fought with the utmost gallantry, they were soon tired of the fatigues of the camp. The arrière ban, or general levy of the nobility, called Pospolite Ruszenie, that is, general movement, could only be raised with great difficulty, and it soon returned home. The treasury was empty, and the nobles, unwilling to submit to any taxation, sought to throw all the imposts on the inhabitants of towns, whose number was comparatively small, and on the peasants, who were already crushed by the oppression of the landowners. The crown was in possession of extensive demesnes, but they were generally granted for life to some noble, and the prodigal Alexander had greatly diminished them. All these difficulties were however overcome by the firmness and prudence of Sigismund, and he was much assisted in his task by the treasurer of the crown, Bonar, who succeeded, by his great industry and strict economy, in restoring order to the finances of the country. The revolt of Glinski, a most powerful Lithuanian grandee, who, having been educated at the court of the emperor Maximilian I., acquired great military skill in his campaigns, involved Sigismund in a bloody war with Muscovy. Glinski, who had enjoyed supreme influence under Alexander, created many enemies, who attributed to him treasonable projects, and he was treated with perhaps injudicious harshness by Sigismund. He attacked and murdered his chief enemy, Zabrzezinski, a powerful grandee, and having committed that crime, he declared, together with a great number of adherents, for the Czar of Moscow, who promised to elevate him to the dignity of a sovereign prince of Smolensk. Aided by the traitor, the Muscovites invaded without opposition many provinces of Lithuania, but a brilliant victory obtained by the king in person stopped the progress of the enemy, who were expelled from the Polish frontier, and their own country was invaded. The spirit of insubordination among the army however prevented Sigismund from obtaining any result from his victory, and he was obliged to accept the Czar's proposals of peace. It was concluded by a treaty which left the frontier of the belligerent powers in the same state as it was before the war. The families of Glinski and his adherents were permitted to join them in Muscovy, but many of them were pardoned and restored to their estates and former dignities. [RUSSIA.]

Bohdan, prince of Moldavia and Wallachia, invaded (A.D. 1510) the southern provinces of Poland; he was however soon defeated, and compelled to conclude a treaty, by which he acknowledged himself the vassal of the kings of Poland. This acquisition became afterwards the origin of long and bloody wars with the Ottoman Porte, but an immediate collision with that power was avoided by the prudence of the king.

Pope Julius II. sent an embassy to Sigismund to compliment him on his recent success, and to propose to him to become the head of a league which that pope proposed to form for the expulsion of the Turks from Europe; but this flattering proposition was declined by the Polish monarch, and a brilliant victory over the Tartars, in which 27,000 of those barbarians were slain, secured for a considerable time the tranquillity of the frontiers. Sigismund married Barbara, daughter of Stephen Zapolya, waywode of Transylvania. The emperor Maximilian, who watched with jealousy the influence which Poland exercised over Bohemia and Hungary, and which was increased by Sigismund's marriage, by his intrigues, and particularly by the agency of Glinski, incited the Czar of Muscovy to attack Poland. In 1514 the Muscovites invaded the frontier of Lithuania with an immense force, and took Smolensk. They advanced into Lithuania with an army of 80,000 men, which however, being met by the Lithuanian general, Prince Ostrogski, with a force of 32,000 men, was completely routed at the battle of Orsha. But this brilliant victory was without any result, as the army soon dispersed, without even retaking Smolensk, which remained in the possession of Muscovy at the ensuing peace.

These events induced the emperor Maximilian to seek the friendship of Sigismund, whom he invited to a congress at Vienna in 1515. This meeting produced no advantage to Poland, and the promises given by the emperor on that occasion to interfere with the Teutonic order and the Muscovites on the behalf of Poland, proved entirely delusive. The matrimonial alliance between an Austrian duke and a Jagellonian princess of Bohemia, which was agreed on there, in the course of time placed the crowns of Bohemia and Hungary on the head of the Austrian monarchs, a circumstance which greatly increased their power, and destroyed the influence that Poland had possessed over those countries.

After the death of his first queen, Sigismund married Bona, the daughter of John Galeazzo Sforza, last duke of Milan: She was a most beautiful and accomplished princess, but of a dissolute and abandoned character. She did much mischief by her ambition and intrigues, although she introduced into Poland many Italian refinements, and the Spanish courtesy, which rendered the court of Poland one of the most brilliant and refined in Europe.

The troubles produced by the Reformation of Luther in the Prussian provinces induced Sigismund to repress them by severe measures, which were however taken from political motives, and not from any religious intolerance; for Sigismund on many other occasions showed himself very tolerant towards the doctrines of the Reformation, which under his reign spread over all Poland.* Albert of Brandenburg, grand-master of the Teutonic order, having become a convert to Protestantism, the part of Prussia which was still held by the Order was erected into a secular principality, and Albert of Brandenburg was created hereditary duke of Prussia, and became a liege to the crown of Poland. Thus Poland gave the first example of a diplomatic recognition of a Roman Catholic institution, secularised by the Reformation. Albert's successors continued to recognise the suzeraineté of Poland till the treaty of Velau (1657), by which Prussia was declared an independent dukedom. This was the origin of the dominion of the Brandenburg family over Prussia.

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* In an answer to Eckius, the celebrated antagonist of Luther, who had sent him Henry VIII.'s book against that reformer, he says that he wishes to be king of goats as well as of sheep.

The dukedom of Mazovia was reunited with Poland after the death of the last prince in 1526; and the Wallachians, who attacked Poland in 1530, were defeated with great loss. The affairs of Wallachia requiring the display of a considerable force, the king ordered the arrière ban of the equestrian order to assemble at Leopol in 1539. According to the account of a contemporary historian (Orichovius), 150,000 militia, splendidly armed, assembled at the royal summons. But this numerous force, instead of marching against the common enemy, raised an outcry against the authority of the king, claiming the redress of certain imaginary wrongs, and the extension of their already overgrown privileges. Thus they separated, without producing any effect whatever, and the memory of this miserable expedition was ridiculed by the nickname of the Chicken War.

Sigismund died in 1548, in the 82nd year of his age, with the character of a wise, just, and magnanimous prince, notwithstanding that in the latter years of his reign he had become unpopular, owing to the misconduct of his queen Bona, to whom he was dotingly attached. He was succeeded by his son Sigismund Augustus, who had been elected and crowned during his lifetime, and was only then ten years old. Before his accession to the throne, and even after the death of his first wife, Elizabeth of Austria, he secretly married Barbara Radzivill, widow of Gastold, palatine of Troki, a most beautiful and accomplished lady, and he declared his marriage publicly a few days after he was proclaimed king. This union, although agreeable to the Lithuanians, was strongly opposed by the Poles, who were afraid that it would give the Radzivills and other Lithuanian families an undue influence in the councils of the king. A violent opposition, influenced by the queen mother, was raised in two diets against the king's marriage, who was required to abandon his wife, and the primate Dzievzgowski promised to distribute on the heads of all the nation the sin of perjury which the king would commit by breaking his marriage oath to Barbara. The firmness of the king quelled that factious opposition, and Barbara was crowned, but she died shortly afterwards, not without strong suspicion of having been poisoned by her mother-in-law Bona Sforza.

At the suggestion of his mother, Sigismund Augustus married Catherine of Austria, the widowed duchess of Mantua. This was a very unfortunate marriage for Poland; it was the cause of Sigismund Augustus dying without issue, of the Jagellonian dynasty becoming extinct, and the throne, which during its existence had been elective only in theory, becoming so in practice.

The most remarkable events of Sigismund Augustus's reign are the acquisition of Livonia, which voluntarily submitted to Poland, in order to save itself from the Muscovite yoke, and the union between Poland and Lithuania, which was effected at the diet of Lublin, 1569. By this arrangement, it was agreed that the deputies and senators of both nations should deliberate in common. The rights of the Polish nobles were extended to those of Lithuania, and the throne of both countries became equally elective; yet the laws, finances, and army remained distinct. This union continued until the final dissolution of Poland.

It was under the reign of Sigismund Augustus that the doctrines of the Reformation acquired a great influence in Poland, particularly among the higher classes: so that there was a time when its complete triumph was expected by the enemies and equally dreaded by the adherents of Rome. Sigismund Augustus was wavering, and his mind seems to have been much unsettled by the conflict of religious opinions. There are however sufficient grounds to believe that he was friendly to a reform of the national church, as his favours were bestowed chiefly on the open and secret promoters of that measure. It is therefore very probable that had he lived longer, this great event would have taken place in Poland.

The interregnum produced by the death of Sigismund Augustus (1572) was dangerous to the peace of the country, particularly as the election of the new king was embarrassed by religious differences. Both the Roman Catholics and the Protestants wished to place upon the throne a candidate of their own persuasion. The following were the candidates for the vacant throne: Ernest, archduke of Austria, brother to the emperor Maximilian II.; Henry of Valois, brother of Charles IX. of France; John III., king of Sweden, son of Gustavus Vasa, who was married to a sister of the late king, and sought the crown of Poland either for himself or for his infant son Sigismund; the Czar of Muscovy, Ivan Vassilovich; and among the natives, John Firley, palatine of Cracow, the chief of the nobles who followed the Reformed or Helvetian confession, aimed at the crown of his country, and had a good chance of success. The hopes of Firley were however destroyed by the jealousy of the Lutheran nobles, headed by the powerful families of Gorka and Zborowski. The diet of convocation, which assembled in January, 1573, adopted a measure which reflects great credit on the prudence of the nation, particularly if we consider the violence of religious parties at that time. It enacted that all the religious sects which at that time divided Poland should enjoy equal rights and privileges; and this enactment, known under the appellation of the Confederation of 1573, became the fundamental law of Poland, and was violated only during the melancholy decline of that country. The extraordinary address of the French ambassador Monluc, bishop of Valence, secured the election of the French prince, notwithstanding the universal feeling against the royal house of France created throughout Poland by the massacre of St. Bartholomew. Monluc gave, in the name of his master, all the guarantees which were required for the political and religious liberties of the nation, and even consented to the demand of the Polish Protestants that favourable conditions should be granted to their co-religionists in France. The solemn embassy which was sent to Paris, in order to announce to the new king his elevation to the throne, gives a favourable idea of the advanced state of civilization at that time in Poland. Thuanus speaks in the highest terms of the great information of the Polish delegates. Henry, after some hesitation, swore to the conditions of election, and went to Poland; but a few months after his arrival, having learned the death of his brother Charles IX., by which he inherited the throne of France as Henry III., he secretly left Cracow (A.D. 1574), and escaped from his new kingdom. He tried however to retain the crown of Poland, and promised to return to that country as soon as the affairs of France would permit him. But as these promises remained for some time unfulfilled, the throne was declared vacant in 1575, and Stephen Battory was elected. He was a very remarkable person, who had risen, by his great merit, from a simple Hungarian noble to the dignity of sovereign prince of Transylvania. This was a most fortunate choice. Battory defeated, in repeated battles, the Muscovites, retook many towns and districts of Lithuania which had been seized by the Muscovites, and invaded their own country. His victorious career was arrested by the intrigues of the Jesuit Possevinus, who induced him to make peace with Muscovy, the Czar of which deceived him by a simulated wish of submitting his church to the supremacy of Rome. Battory was not only a great commander, but a great king, and he established many useful institutions in the country. His death, in 1586, at the moment when he was making great preparations against Muscovy, may be considered as a calamity to Poland, as it destroyed the politic schemes concerted for its future safety, which would probably have been carried into effect. It also opened the field to the quarrels of many powerful nobles, whose factious spirit was restrained by the strong rule of Battory. Several candidates for the vacant throne presented themselves. Fedor Ivanovich, Czar of Moscow, supported by the Lithuanians, was very near being elected. [FEDOR IVANOVICH.]

After the failure of the Czar, two parties divided the electors: one supported Maximilian, archduke of Austria; and the other, headed by Zamoyski, one of the most eminent persons of his time, presented Sigismund Vasa, son of the king of Sweden, and nephew by his mother to Sigismund Augustus. Both candidates were proclaimed kings by their adherents; but Maximilian, being defeated and taken prisoner by Zamoyski, was obliged to resign his claim. The choice of Sigismund III. was unfortunate: bigoted in his attachment to the Roman Catholic religion, in which he had been educated, he was ever ready to sacrifice the interests of his kingdom to those of his church. He thus lost his hereditary dominions, and created a general discontent in Poland by his complete subserviency to the Jesuits and the house of Austria, as well as his tendency towards despotism. A civil war ensued; but the insurgents being defeated, the country was restored to peace. An individual named Demetrius, pretending to be the legitimate heir to the throne of Moscow, who was believed to have been murdered by Godoonoff [GODOONOFF], appeared in Poland. Sigismund, expecting that he would subject the Russian church to the supremacy of Rome, secretly favoured him; and many powerful grandees having espoused his cause, he ascended the throne of Moscow, but was afterwards murdered in a popular riot. An impostor however appeared, who pretended that he had escaped from the massacre, and created great disturbance in Muscovy, where Prince Shooyski was elected Czar instead of the murdered Demetrius. Sigismund, taking advantage of the distracted state of Muscovy, declared war against that country; and the Polish general Zolkiewski, having defeated the Muscovite army and an auxiliary Swedish force, entered Moscow, and concluded a treaty by which Vladislav, eldest son of Sigismund, was elected Czar of Moscow, 1610, on conditions which limited the absolute power that the monarchs of that country hitherto possessed. Shooyski, who had been deposed previous to the entrance of the Poles, was conducted to Poland, where he died in captivity. Zolkiewski made the noblest use of his victory over the Muscovites. Though he entered their country as a conqueror, he restored tranquillity by placing on the throne a Polish prince, and giving to a nation oppressed by the most abject despotism the advantages of a free government, a benefit which was due not to the demands of the Muscovites, who were anxious only to secure the interests of their church, but to the generous and sound policy of the Polish general, who foresaw the dangers which threatened his own country if a prince likely to become its king should possess despotic power in Muscovy. The inhabitants of Muscovy were willing to swear allegiance to their new king; but the accomplishment of that fortunate event, which would have established a constitutional government in Russia, and created a Slavonian empire, and the most powerful state in Europe, was destroyed by the jealousy and incapacity of Sigismund, who, instead of confirming those conditions, delayed his confirmation under various pretences, and in the mean time endeavoured to possess himself of some towns and provinces of Russia. The Muscovites, justly irritated by Sigismund's conduct, rose in arms, and a bloody war ensued, during which the Polish general, ill-supported by the king, maintained himself for a long time against the Muscovites, but was finally obliged to retire. The refusal of the diet to grant the necessary supplies produced insubordination in the army, which was unpaid, and the Russians gained great advantages. Sigismund at last made an effort, and sent his son Vladislav to recover, at the head of an army, the throne which was lost through his father's incapacity, and already occupied by Michael Federovich Romanow, who was elected in 1613. Vladislav penetrated to the walls of the capital; and after an unsuccessful attempt to carry it by storm, occupied a strong position in its vicinity: but the insubordination of the army, which was still badly paid, and several impolitic measures of the king, hastened the conclusion of a truce of fourteen years, by which the Czar Michael Federovich was recognised by Poland, which retained Smolensk with other provinces. This truce was urgent, on account of the increasing hostilities with Turkey, which originated chiefly in the disputed possession of Moldavia, where many powerful Polish grandees, related to Mohila, prince of that country, espoused his part against the Turks, who had deposed him from his dignity. The constant inroads of the Tartars into the Polish territory, and the depredations of the Cossacks, subjects of Poland, committed in the Turkish dominions on the Black Sea, rendered the preservation of peace difficult; but war was rendered inevitable by Sigismund's sending a considerable force to Hungary against Bethlem Gabor, prince of Transylvania, who, with the Bohemian insurgents, was besieging Vienna. This produced a diversion favourable to Austria, but involved Poland in an unnecessary quarrel with Turkey. Zolkiewski, whose expedition against Moscow we have mentioned, having encountered the Turks with a very inferior force, was defeated and killed in 1620. The Tartars ravaged the border provinces; and Sultan Osman marched at the head of an army which is said to have amounted, including the Tartars, to 400,000 men, with the view of conquering Poland, which sent to oppose that overwhelming force only 35,000 Poles and 40,000 Zaporogue Cossacks. The Polish army, under the command of Chodkiewich and Lubomirski, occupied a fortified camp near the banks of the Dniester, and resisted all the attacks of the enemy. Peace was concluded on the 7th October, 1621, on condition that everything should remain in the same state as before the war. In the mean time the Swedes took Riga and many other towns in Livonia, but a truce restored a part of their conquests. War with Sweden was renewed in 1625; but Gustavus Adolphus, unable to obtain any success, proposed, on conditions favourable to Poland, a truce of thirty years, during which the dispute about the succession to the Swedish throne should be settled; but Sigismund, seduced by a delusive promise of assistance from Spain, rejected those offers, and was obliged to conclude, in 1629, a truce of six years, on much less advantageous terms.

Sigismund III. died in 1632, in the sixty-sixth year of his age. His reign of forty-five years was an uninterrupted succession of errors, the immediate effect of which was however in a great degree prevented by the many eminent persons whom Poland produced during his reign; but the seeds of the future calamities of that country were sown by that king. Bigoted in his attachment to the Roman Catholic church, he thought more about the conversion of his opponents than about the interests of his country. Protestantism, which was prevalent in many parts of Poland, was almost entirely destroyed by his efforts; and he effected it not by open oppression, which was rendered impossible by the constitution of the country, but by a cunning system of secret persecution, and by every possible means of seduction.

Several bishops of the Greek church having subscribed to a union with Rome (1598), the opponents of that union, which was supported by the king and the priests, were exposed to much persecution, which scattered the seeds of discontent and future rebellion among the inhabitants of the south-eastern provinces of Poland, and prepared the way for great calamities. Being entirely under the guidance of the Jesuits, the devoted promoters of the interests of Austria, his external policy was constantly subservient to that power, and often at the cost of the interests of Poland. His private character was respectable.

Sigismund's son Vladislav IV. was elected without opposition. He was a virtuous and enlightened prince. Immediately after his coronation he marched against the Muscovites, who had invaded the Polish frontiers, and having defeated them, he entered the frontiers of Muscovy, where he occupied several towns. Peace was concluded in 1634, on advantageous terms to Poland. Soon afterwards the hostilities which had been commenced by the Turks were repelled, and peace was confirmed; the truce with Sweden was also prolonged for twenty-six years. Poland thus enjoyed a long peace during the reign of Vladislav, who died in 1648, at the very moment when a most dangerous rebellion was breaking out.

Although Vladislav was strongly opposed to religious intolerance, his royal authority was insufficient to check the persecution of the followers of the Eastern church, as the long reign of his father had firmly established the influence of the Jesuits in Poland. The consequences of this unfortunate circumstance were soon manifested in the rebellion of the Cossacks of the Ukraine, which originated principally in acts of religious oppression, committed chiefly through the influence of the Jesuits. The rebellion broke out in the last moments of Vladislav, and raged for many years under his brother and successor John Casimir, until Chmielnitzki, the chief of the Cossacks, in 1654, applied for aid to the czar of Muscovy, Alexius, who sent a numerous army to his assistance and another force to attack Lithuania. The situation of Poland was already very critical, but the imprudence of the king made it desperate. Charles Gustavus having ascended the throne of Sweden in consequence of Christina's abdication, John Casimir's ambassador at Stockholm made a protest against his accession to the throne of Sweden, of which his master was the legitimate heir. Charles Gustavus wanted only a pretext for invading Poland, and he was persuaded to do so by Radzieyowski, an influential grandee, who, being unjustly persecuted by the Polish king, became a traitor to his country. The Swedish monarch entered Poland from Pomerania, in 1655, and the adjacent provinces, which were discontented with John Casimir, and influenced by Radzieyowski, joined the enemy, who marched without opposition upon Warsaw. The Polish king fled to Cracow, and thence to Silesia, and Cracow was soon occupied by the Swedes. A Swedish force having simultaneously entered Lithuania, a great number of the inhabitants, menaced by the Muscovites, Cossacks, and Tartars, who ravaged a large part of their country, sought safety by submitting to the protection of the Swedish monarch. A great part of the army, being defeated, was obliged to swear allegiance to Charles Gustavus, who was on the point of becoming king of Poland, his military talents and conciliating policy having gained for him universal respect among the Poles, many of whom believed that their country would regain its power under the rule of such a vigorous sovereign. A deputation accordingly requested him to convoke a diet for his own election, but he proudly answered that he did not require an election, being already master of Poland by the right of conquest. This reply destroyed all his interest, and the Poles began to desert him and return to their king. A confederation was organised in order to restore John Casimir to his throne, and all the nation armed in his defence. The Swedes were attacked, and the czar of Muscovy, jealous of their success, concluded a truce with Poland, and invaded the Swedish province of Livonia. Charles Gustavus maintained himself with great courage and skill. He was joined by Ragotzi, prince of Transylvania, who invaded Poland with 60,000 men, as well as by the forces of the elector of Brandenburg. But these invaders were either destroyed or expelled by the nation, which had unanimously risen against its enemies. The deliverance of the country was principally accomplished by Stephen Czavniecki, one of the bravest and most skilful generals of his time. Denmark having declared war against Sweden, Charles Gustavus was obliged to return to his country. The elector of Brandenburg made peace with Poland and declared war against the Swedes, and Austria sent an auxiliary force to them, which proved of no use, although it was granted on the most onerous terms.

Finally peace was concluded at Oliva, near Danzig, in 1660, by which John Casimir resigned his claims to the Swedish throne, and things were restored to the same state as before the war. This peace gave Poland the opportunity of vigorously repelling the aggressions of Muscovy, with which hostilities had been renewed in 1658, for the Cossacks of the Ukraine, having perceived that the czar of Muscovy was a more dangerous protector than their legitimate monarch the king of Poland, returned to their duty on receiving ample guarantees for their religious and political liberties. The Muscovites were defeated in several battles, and expelled from the country, and their own frontiers were invaded.

This war, which terminated in 1666, destroyed the advantages gained over Muscovy, with which power peace was concluded in 1667, at Andrashov, by which Smolensk and a great part of the Ukraine were left in the hands of the Czar. Both parties were anxious to conclude the peace, being menaced by the Turks, whose aid was called in by Doroshenko, a Cossack chieftain, who intended to withdraw his countrymen from the sovereignty both of Poland and Muscovy, and to place them under the protection of the Ottoman Porte. John Casimir abdicated the throne in 1668, and retired to France, were he died as Abbé de St. Germain, in 1672. He was personally brave, and not without military talent. He had served with distinction in the Imperial armies during the Thirty Years' war.

His disposition was kind and amiable, but easily influenced, owing to which he was governed by his queen and the Jesuits. Before his accession to the throne he had entered the society of the Jesuits, and was afterwards created a cardinal, but the pope released him from his ecclesiastical vows on the death of his brother Vladislav, whose widow he married. His reign was one of the most unfortunate periods of Polish history, and the consequences were equally deplorable. Poland lost Smolensk, and a part of the Ukraine was wrested from her by Moscow. Some important districts were also ceded to the elector of Brandenburg, whose independence of Poland was further recognised by the treaty of Velau, in 1657. The country was depopulated by constant war and pestilence, and emigration to adjoining countries, which was caused by the horrors of war and by religious persecution.

On the death of Casimir there were several candidates for the throne of Poland, but the minor nobility, jealous of the overgrown influence of the magnates, proclaimed as king Michael Prince Wisniowietzki, a young man who had no pretensions to this dignity.

The partisans of the other candidates were carried away by the majority of the electors, and Michael was reluctantly compelled to accept a crown, the burden of which he was not qualified to support. His reign was disturbed by the factious opposition of the primate, who wished to dethrone him, and who was assisted by many powerful grandees, which nearly produced a civil war. The Turks invaded the country with an immense army, and the heroic John Sobieski was unable, notwithstanding prodigies of valour and his great military skill, to arrest their progress. Peace was concluded in 1672, by which Poland ceded to Turkey a part of the Ukraine, and consented to the annual payment of 22,000 ducats. King Michael died in 1673, just at the time when the diet had resolved to break the ignominious peace concluded the preceding year with the Turks; and John Sobieski, who had obtained a brilliant victory over those enemies on the day after the death of Michael, was elected in his stead, notwithstanding the competition of numerous candidates.

Poland somewhat recovered her strength under the rule of that heroic monarch, whose biography requires a separate article. [SOBIESKI.] The reign of his successor, Augustus II. of Saxony (1690-1733), and of Augustus III. (1733-63), are described elsewhere. [Vol. iii., p. 96.] The reign of Augustus III., although tranquil in consequence of the torpor into which the nation had fallen from long exhaustion brought upon it by continual disasters from 1648 till 1717, was fraught with the most eventful consequences. Augustus, who owed his elevation to Russia, fell, chiefly through the instrumentality of his favourite minister, Count Bruhl, entirely under the influence of the cabinet of St. Petersburg, which was anxious to maintain that influence by the weakness of Poland. The Russian court never failed to assure the king that it would never suffer the formation of the smallest confederation or any attempt at innovation which should be directed against the authority of the king or the republic. It meant that it would never permit any improvement of that constitution which kept the country in a state of continual disorganization.

The condition of Poland was indeed wretched at that period. The constantly increasing power of the equestrian order rendered government impossible, and the law was braved with impunity by many powerful nobles, who, although legally on the same footing as the poorest noble, were as powerful as independent sovereigns. A preposterous system of education, which was entirely in the hands of the Jesuits, had so benighted the nation, that it remained satisfied with its condition, imagining itself to be free, while in fact it was governed by foreign influence. This state of things made many patriots strongly feel the necessity of reforming the constitution, which was the cause of all the misfortunes of the nation; but opinions were divided as to the means of attaining this object. The majority of the nobles, headed by the Potockis and Radzivills, wished to maintain all the privileges of their order, and were strongly attached to the Saxon dynasty, which was favourable to their opinions. This Saxon or court party was opposed by the Czartoryskis, who, perceiving that a liberty which was destroying national independence was only an idle name, wished to establish a strong government as the only means of raising the country from its deplorable condition.

Prince Michael Czartoryski and his brother Augustus, who were descended from a collateral branch of the Jagellonian dynasty, possessed at that time immense wealth and great influence. Both of them also possessed great abilities and activity. They undertook to change the republican constitution of Poland into a well-organised monarchy, which, as they justly thought, was the best means of raising Poland from the humiliating position into which she had fallen through her feeble government. For the attainment of that object they had to struggle against the prejudices of the nation and with powerful parties. Keeping their object steadily in view, they encouraged science and literature, elevated to a certain degree of consideration families of little note, and raised others which had been reduced by adverse circumstances. They also sought out and ptronised men of superior talent, and such as by their writings exerted an influence on public opinion, by which means they powerfully contributed to the restoration of literature in Poland.

In this manner they were preparing the nation for a change in the constitution, which however could not actually be effected without force. They endeavoured therefore to gain the favour of the court of St. Petersburg, believing that the venal and incompetent ministry which then governed Russia might be induced to adopt measures useful to Poland. This project was also much encouraged by the English minister in Poland, Sir Hanbury Williams, who endeavoured to counterbalance the interest of France, which supported the republican or Saxon party; and he promised the Czartoryskis the assistance of England and Russia. If the same spirit which presided over the councils of Russia under Elizabeth had continued to govern that country, the project of the Czartoryskis might have been successful; but the accession of Catherine II. entirely changed the state of affairs. The projects of the Czartoryskis, becoming known, created a great sensation even before the death of Augustus III. A Russian force having entered Poland to support the election of Stanislas Poniatowski, the lover of Catherine and a relation of the Czartoryskis, they availed themselves of the assistance of that force, in order to compel the Diet of Convocation to adopt several laws by which the power of dissolving the diet by the *veto* of a single member was considerably limited, the executive authority of the crown strengthened, and the excessive privileges of the nobles were restricted. Their project of abolishing the *veto* altogether was prevented by the foreign ambassadors, and the proposition of electing the king by deputies chosen for that purpose was also defeated. The same diet declared that the confederation continued to exist, which prevented future diets, as long as it was not dissolved by the *veto*. Thus the Czartoryskis accomplished, although by violent and illegal means, a most salutary revolution. The same preponderance which brought about those reforms, effected the election of Poniatowski in 1764, and the diet of his coronation confirmed the reforms to which we have alluded, and introduced other important improvements, particularly in the financial department.

Russia soon perceived how dangerous to its influence in Poland were the reforms which strengthened the government of that country, and it gave its support to the opposition, which was composed of many patriotic individuals, and was too blind to see the advantages of those reforms, being afraid lest they might conduct to a despotic government. The diet of 1766 restored, with some few exceptions, the antient force of the *veto*. The same power, under the pretext of defending the rights of the anti-Roman Catholic confessions, created division all over the country, and finally, in the diet of 1768, in addition to the equitable law of restoring all Christian confessions to equal rights, passed several others of a different character, which tended to weaken the government, and the acceptance of a Russian guarantee declared that state of things immutable.

In order to save the country from foreign influence, a confederation was organised at Bar, a little town in Podolia, by the patriotic bishop of Kamieniec, Adam Krasinski. Ill supported and without any regular troops, it struggled for several years against the forces of Russia, until it fell by exhaustion. The Turks, who had taken up arms in favour of Poland, after having represented in vain to the cabinets of Europe the danger of Russian predominance in Poland, were defeated, and the first partition of Poland, which was planned by Frederic II. of Prussia, took place in 1772. By this partition Poland lost, of the 13,500 square miles (15 to a degree) of its territory, 3925 square miles, which comprehended its best provinces, and were unequally divided between Russia, Prussia, and Austria. The spoliating parties called a diet to sanction this iniquitous transaction, and imposed on the country a permanent council, which deprived the king Poniatowski even of the shadow of authority. This great calamity roused the nation, which now strove to compensate its heavy loss by internal improvements. An excellent system of public education was introduced, and literature was encouraged; industry was re-animated, and every kind of improvement rapidly advanced, through the exertions of many distinguished individuals and of the king himself, who earnestly strove to ameliorate the condition of the country. The chancellor, Andrew Zamoyski, an enlightened and patriotic nobleman, prepared a new code, which removed many antient abuses and partly emancipated the peasants. The code was rejected by the diet of 1780, but an improved public opinion produced in a few years a general wish for a reform in the constitution of the country. The diet which assembled in 1788, having declared itself permanent, continued till 1792, when, on the 2nd of May, it proclaimed a new constitution, which abolished the *veto*, made the throne hereditary in the Saxon family, which was to succeed after the demise of Poniatowski, the reigning king, and introduced some useful regulations. It acknowledged at the same time the necessity of further reforms by enacting that there should be a revision of the constitution after the lapse of twenty years. But a fatal error was committed in neglecting to organise a national force capable of protecting the new constitution from the aggression of its enemies. Russia, who had guaranteed the former state of things in Poland, excited a party composed of a few factious nobles, who, assisted by her troops, formed a confederation at Targovitza, in order to overthrow the new constitution. The king, instead of marching against his enemies, betrayed the cause entrusted to his defence, and, instead of opposing the advance of the Russians, as he had most solemnly promised to do, and ordering a general levy, or arrière ban, he paralysed by his orders all measures of defence, and soon became a party to the infamous confederation of Targovitza. On the other side, the king of Prussia, who had encouraged the patriots to amend the constitution, joined the Russians and invaded Poland. The consequence of all this was a second partition of the Polish territory in 1793, by which Prussia took 1061 square miles (15 to a degree), Russia 4553, and Poland retained 4016. The remaining part of Poland was subjected to every kind of vexation from the confederates of Targovitza, who, encouraged by the presence of Russian troops, persecuted the patriots in every possible manner, and the chief persons among them were obliged to seek refuge abroad. The spirit of patriotism was however not quelled by these circumstances. An extensive conspiracy was organised, and insurrections broke out in several parts of Poland. In 1794 Kosciusko arrived at Cracow, and, having assembled a number of peasants armed with scythes, he defeated a superior number of Russian regular troops. The inhabitants of Warsaw, which was occupied by a strong Russian army, rose against their oppressors, and expelled them after a bloody contest. Vilna did the same. Several individuals were convicted of high treason and executed, but the king was treated with respect. The Poles fought with the utmost bravery, but their courage and patriotism proved unavailing against the overwhelming numbers of Russia and Prussia. Kosciusko was defeated, wounded, and taken prisoner at the battle of Maciejovice, and Praga, the suburb of Warsaw, was carried by storm by Suvaroff, and all the inhabitants were massacred. Warsaw capitulated, and the remainder of Poland was divided in 1795 among Russia, Prussia, and Austria.

Thus Poland was erased from the list of independent states; but the national spirit, which had for centuries withstood the most adverse circumstances and maintained the existence of the state in spite of the dissolving tendency of its constitution, received a new impulse and became more energetic through the severity of the national misfortune. The preservation of nationality against foreign domination was the principal care of those patriots who remained in the country, whilst others raised the national banner in the French armies. On the proposal of General Dombrowski, Polish legions amounting to several thousands of men were formed by the French Directory. This force preserved its national uniform, and fought with great distinction in Italy; its numbers being constantly supplied by fresh arrivals from Poland, as well as by the prisoners of the Austrian troops that were levied in the Polish provinces. These legions were in the pay of the Italian republic, but large sums of money for their support were frequently collected and transmitted from Poland. The extraordinary success of the French armies maintained among the Polish legion a hope that their services in the cause of France would be finally rewarded by the assistance of that power in restoring the independence of their country; but treaties were concluded with the powers which had dismembered Poland, without any regard to the interest of that country. A great number of these troops were sent by the French to St. Domingo, whence few returned. Some of their soldiers went back to their homes after the peace of Luneville, whilst a considerable number continued in the French army. The fate of the dismembered provinces differed according to the governments under which they fell. The Prussian part was well treated in some respects, and the high prices of corn in England gave a great impulse to their agriculture. The state of the peasants was ameliorated, and several improvements were introduced, but these advantages were more than counterbalanced by a decided tendency to establish Germanism on the ruin of everything that was national. The Austrian government was not more favourable to the nationality of its Polish subjects; it introduced some few improvements, such as roads, but it exhausted the Poles by heavy taxes and levies of soldiers in its long wars with France. The Russian part may be considered as having been in some respects the most favoured of all. There were indeed no material improvements, except that for some time agriculture was prosperous owing to the exports of corn to England. But the national language was preserved in all official transactions, and an excellent system of public education, which was carried on in the same language, was introduced by the university of Vilna under the superintendence of its curator Prince Adam Czartoryski, who, supported by the friendship of the emperor Alexander, whose minister he had become, preserved with his sanction the nationality of Poland in the Russian provinces, where the antient laws relating to civil affairs were also retained. Alexander seemed to entertain for some time an idea of restoring Poland and becoming its king.

The success of the French arms against Prussia in 1806 reanimated the hope of the Poles to see their country restored. As soon as the French entered the Polish territory, the inhabitants rose in their favour, and organising themselves into a military force with amazing rapidity, immediately joined the French in combating the enemy. Yet Napoleon, after his success against the Russians, stopped at the banks of the Niemen, and concluded at Tilsit a peace with Russia. The Polish territory which had been taken by Prussia in 1793-5 was erected into a sovereign state under the name of the duchy of Warsaw, with the exception of the province of Bialystok, containing about 180,000 inhabitants, which was given to Russia. A representative constitution was granted, the French code of laws introduced, and the sovereignty declared hereditary in the house of Saxony. The new state, comprehending 1850 square miles (15 to a degree) and 2,200,000 inhabitants, was obliged to maintain an army disproportioned to its population, and of which a considerable part was sent to Spain. In 1809 the Austrians invaded the duchy and occupied Warsaw, which the Polish forces were obliged to evacuate after an unequal combat; but having entered Austrian Poland, their numbers were rapidly swelled, so that their insignificant force soon became a considerable army, and compelled the Austrians to evacuate the duchy of Warsaw, and also a large part of the Polish territory which they held, which increased the duchy of Warsaw to 2800 square miles (15 to a degree) and 3,780,000 inhabitants. The treaty of Vienna arrested the career of the Poles, and only a part of Austrian Poland was united with the duchy of Warsaw. The campaign of 1812 seemed destined to realise the hopes of the Poles, and they made the greatest exertions to contribute to its success. Eighty thousand men marched under Poniatowski and Dombrowski with the French army. But Napoleon damped their hopes at the very beginning by refusing to the Polish deputation to declare at once the restoration of Poland; and he committed a great error in not leaving the Polish army to occupy all the antient territory of Poland, a great part of which was in the occupation of the Russians, whilst the Polish army marched with the French to Moscow.

At the congress of Vienna in 1815, the plenipotentiaries of Great Britain and France, Castlereagh and Talleyrand, were in favour of the restoration of Poland, to which Austria was not averse. But the landing of Napoleon from Elba created interests of a more pressing nature, and the affairs of Poland were arranged in the following manner:—A part of the duchy of Warsaw, containing about a million of inhabitants, was given to Prussia under the title of the duchy of Posen. The salt-mines of Vieliczk and some districts were given to Austria. Cracow with a territory of 490 English square miles, and about 120,000 inhabitants, was erected into a republic; and the remainder was entitled the kingdom of Poland, and united to Russia under one sovereign. The new kingdom received a representative constitution, which guaranteed security of person and property in the strictest sense, the liberty of the press, the responsibility of ministers, the independence of the judges; the use of the national language; and a national military force. The representative body was composed of two chambers, senators and deputies; the former of them were nominated by the king for life, and their number was never to exceed one-half of that of the deputies, which was 138. All the antient Polish provinces which remained under the dominion of the three dismembering powers were promised by the same congress of Vienna a representation and national institution conformable to the nature of the government under which they remained.

Such a liberal constitution granted to a kingdom with 4,000,000 of inhabitants, whose sovereign was monarch over more than 50,000,000 subjects, was a perfect anomaly. It could not be expected that such a constitution should be faithfully maintained; and it was not. The hopes raised by the emperor Alexander, that the Polish provinces incorporated with Russia should be united with the new kingdom, were soon dissipated, and discontent began to spread among all the Polish population. The country, it is true, began to make rapid progress in agriculture, and industry was greatly increased; but the despotic power given to the grand-duke Constantine, brother of the emperor Alexander, who was commander-in-chief of the army, and which manifested itself in the most capricious acts of wanton oppression, irritated the army as well as the inhabitants. Notwithstanding the pledge given at the congress of Vienna to maintain the Polish nationality in the provinces incorporated with Russia, the acts of government evinced a systematic hostility to all that was national. This was particularly the case with the system of public education, which was organised by Prince Adam Czartoryski in a manner favourable to the conservation of the national language and literature. The Russian senator Novossilzoff, to whom the government of the Russo-Polish provinces was entrusted, established a most vexatious system of espionage over the university of Vilna and the schools dependent upon it. Many young men who had formed a society for promoting literature and moral improvement, were imprisoned, and although nothing criminal could be proved against them, they were sent to distant provinces of Russia and forced to enter into the civil service. Many boys, irritated by this system of oppression, had manifested their feelings in violent language at their secret meetings, in which they meditated some childish schemes of resistance; but instead of being visited with the usual school correction, they were sent to serve as common soldiers, and some were condemned to the mines of Siberia. Similar persecution of the students took place at Warsaw, and the system of instruction was continually rendered less efficacious by substituting absurd modes of teaching for sound methods, and by limiting the subjects of instruction. A severe censorship prevented not only the printing of every work of liberal principles, but even the introduction of similar works from abroad.

These causes produced their natural result. Conspiracies began to be organised: the discovery of some increased the severity of the oppression, and the country was infested with spies in the pay of Russia. This only served to irritate the nation. An extensive conspiracy, chiefly among the army and the students, was ready to attempt the overthrow of the Russian government in 1829, when that power was engaged in a war with Turkey, and it was only prevented by some more cautious or timid individuals. The French revolution of July, 1830, which produced a general excitement all over Europe, was not without effect on public opinion in Poland; an insurrection was meditated, and the time was fixed for the spring of 1831. This insurrection would perhaps have never taken place—as the foreign policy of France soon became anti-revolutionary—if the government, having discovered some traces of conspiracy, had not begun to arrest many of the members, a circumstance which forced them to accelerate the time of the insurrection. It took place on the 29th of November, 1830, and was effected by the military school, composed of about 200 young men, who were joined by many students of the university and a few thousands of Polish troops stationed at Warsaw. The Russian troops, which had made some ineffectual attempt to put down the insurrection, took up a position near the town, under the grand-duke Constantine, with whom two regiments of Polish guards remained. Although a few obnoxious individuals were massacred during the insurrection, which they attempted to prevent, it was not sullied by pillage or wanton bloodshed. A provisional government was organised from among the members of the supreme administration, with the addition of some popular persons, and Chlopicki, a veteran general of high military reputation, and universally esteemed for his independent character, was appointed commander-in-chief of the army. The new government acted in the name of the emperor Nicholas as king of Poland, and the grand-duke Constantine remained in his position awaiting the arrival of the army which was summoned to Warsaw from different places. The army having assembled and declared for the Revolution, the grand-duke as its commander, by an order of the day, transferred his authority to the national government, a fact which shows that the Polish army in following that order did not break its oath of allegiance to the emperor of Russia as king of Poland, even in combating against his armies.

The provisional government made an agreement with the grand-duke, by which he was allowed to retire from the country with about 8000 Russian troops and twenty-four cannon. This concession, obtained by Constantine's appeal to the generosity of the Polish nation, was a fatal error; by disarming these troops and retaining the grand-duke as a hostage, not only material advantages might have been gained, but a negotiation with the emperor Nicholas would have been facilitated. Chlopicki proclaimed himself dictator, a measure which was generally approved, as tending to prevent disorder, and as giving strength to the national force; but this extraordinary authority was employed by him only in fruitless negotiations with the Russian emperor. Had he immediately marched on Lithuania, the Russian army stationed in that province, and composed of natives, would immediately have joined the Poles, which would have more than doubled the number of regular troops, besides effecting a general insurrection in that country. Thus while the Poles lost the most precious time in inactivity, the Russians had time to concentrate their troops, and the Polish deputation sent to Petersburg obtained from the emperor no other conditions than absolute submission. Chlopicki, after having brought the country into such a critical position, resigned the dictatorship, and was with great difficulty prevailed upon to promise his assistance to Prince Radzivill, who was nominated commander of the army which was now to oppose the Russians. The diet assembled at Warsaw, having received the answer of the emperor, declared, on the 25th of January, 1831, the throne vacant; organised a national government under the presidency of Prince Adam Czartoryski, and resolved on a vigorous defence. This defence appeared hopeless, as the Poles had only 50,000 men and 136 cannon, besides 14,000 men in the fortresses of Zamosc and Modlin, and dispersed in several parts of the country; while the Russians crossed the frontier with 130,000 men and 396 cannon. This army marched towards Warsaw, whither the Poles were retiring in order to fight under the walls of that city in a position which gave to their small forces a chance of resisting the overwhelming numbers of the enemy. The first combats were favourable to the Poles. General Dwernicki having, on the 15th of February, suddenly attacked and defeated a superior Russian force, with scarcely any loss to himself, several battles took place from the 17th to the 19th of February. An indecisive though murderous battle was fought on the 20th. On the 25th the Russian field-marshal Diebitch concentrated his forces, which were increased by the arrival of fresh resources to 120,000 men and 400 cannon; and he made an effort to crush the Polish army, consisting of about 40,000 men and 100 cannon. A bloody battle ensued, in which the Poles, notwithstanding the inferiority of their force, would have obtained a victory, if some unfortunate circumstances, as well as some faults of the general, had not prevented them from taking advantage of several favourable moments. The Poles lost, from the beginning of the campaign, 11,000 men in killed and wounded: the loss of the Russians is estimated at about 30,000. The Poles retired beyond the Vistula, which separated them from Warsaw, and the armies, except some partisan or small bodies under General Dwernicki, remained inactive, chiefly on account of the difficulty of passing the river at that season. The Polish general-in-chief Skrzynecki, who was invested with the command after the battle of the 25th of February, employed this time in recruiting his forces; but on the 31st of March, when the Russians were making preparations for crossing the Vistula above Warsaw, he attacked and defeated the enemy, of whom 14,000 were taken prisoners. The Russians also lost 10 cannon, and about 4000 in killed. The loss of the Polish troops was insignificant. This advantage however was not followed up as it ought to have been. Meanwhile an insurrection broke out in Lithuania as well as in Volhynia and Podolia. General Dwernicki marched to assist the insurgents of Volhynia, but he was compelled by an overwhelming Russian force to retire into Austrian Poland, where his corps was disarmed and himself kept prisoner; but many officers and soldiers escaped, and joined the Polish army. The Polish commander-in-chief committed many errors, particularly by his unwillingness to strike a decisive blow from a delusive hope that European diplomacy would interfere and settle the question of Poland. After having lost an excellent opportunity of destroying or capturing the Russian guards, he was surprised, and obliged to give battle under very unfavourable circumstances, at Ostrolenka, on the 26th May. The Polish army, much inferior in numbers and in artillery to the Russians, fought in a most disadvantageous position, and was only saved from total defeat by their extraordinary courage and the energy of the commander. The consequences of this battle were deplorable; the troops sustained an enormous loss, particularly of officers; some regiments, which were cut off by the Russians from a communication with the Polish army, were unable to rejoin it, and were obliged to march into Lithuania in order to join the insurgents there, to whom some small assistance was already sent; and the confidence of the army in the ability of the commander-in-chief was shaken, if not entirely destroyed. The troops sent to Lithuania at first obtained great advantages, and would probably have restored the cause of Poland if these prospects had not been ruined by the incapacity of General Gielgud, their commander. A great part was obliged to enter the Prussian territory, where they were disarmed and kept as prisoners; and another part, under General Dembinski, returned to Warsaw, after having effected an almost miraculous retreat of several hundreds of miles, constantly surrounded by the enemy.

Polish affairs assumed a melancholy appearance after the battle of Ostrolenka. The want of ammunition and of every kind of resources was continually more and more felt. This was chiefly caused by the Prussian government, which did not permit the slightest assistance to the Poles to cross the frontier. The Russians, on the contrary, were allowed to have their magazines on the Prussian territory, and always found a friendly asylum whenever they were obliged to retreat there, while the Poles in such cases were invariably disarmed and retained prisoners.

The Russian commander-in-chief Diebitch, died suddenly on the 9th of June, and was succeeded by Paskevich, who had distinguished himself in Asia against the Persians and the Turks. Paskevich resolved to cross the Vistula, and he accomplished his plan by marching near the Prussian frontier, where his magazines were in perfect safety, and where the bridges by which he effected his passage were prepared. The Polish generals committed several faults, by which the Russians escaped from imminent danger, and their army approached Warsaw on the left side of the Vistula. Skrzynecki, who remained under the fatal delusion that the affairs of Poland would be settled by diplomacy, continued to avoid a battle, and the government deprived him of the supreme command. The general excitement produced among the population of Warsaw by the indecisive conduct of those in power, caused a riot on the night of the 15th of August, during which the prisons were forced, and 35 individuals, chiefly spies of the Russian government, and some traitors, together with a few innocent persons, were murdered.

The government, feeling its weakness, resigned its authority, and General Krukowiecki, who is considered to have fomented the troubles of the 15th of August, succeeded through his intrigues in being chosen president of the government. The town being in want of food, a considerable force was detached to collect provisions in the provinces on the right bank of the Vistula, and only 30,000 men were left to defend Warsaw. Provisions were supplied, but the forces sent for them could not reach Warsaw in time, which being attacked on the 6th of Sepember by the Russians, was surrendered to them by Krukowiecki on the 8th. The army, followed by the members of the diet and many leading persons, retired on the right bank of the Vistula, and thence towards the frontiers of Prussia, which they were obliged to enter on the 8th of October, whilst another part of the army was compelled, on the 17th of September, to retire on the Austrian territory. For further particulars the reader may consult *La Guerre de Pologne en* 1831, by M. Brzozowski, the best work which has hitherto been published on this subject.

Thus ended a memorable struggle, which attracted the attention of all Europe, and which, notwithstanding the disproportionate inequality of forces, lasted from February to October, protracted by the desperate courage of the Poles as well as by many faults committed on both sides. The consequences were most deplorable to Poland, and cannot be considered as fortunate to Russia. The emperor Nicholas, instead of adopting a system of clemency, as was generally expected, exercised the utmost severity against the Poles. Many individuals who had taken a part in the insurrection were condemned either to the mines of Siberia or sent to serve as soldiers in the Caucasus and other Asiatic provinces. The constitution was formally abrogated, and another form of government, called the organic statute, introduced. The universities of Vilna and Warsaw, as well as many minor schools, were abolished, and the public libraries and museums were carried away to St. Petersburg and other parts of Russia. An amnesty was proclaimed, but with numerous exceptions, and many soldiers who returned in consequence of that amnesty were compelled to serve in the Russian ranks. Several other measures were adopted tending to destroy the nationality of Poland, and a great number of patriots emigrated to foreign countries.

Sketch of the Polish Constitution before the first dismemberment of Poland.—The king was elective. As soon as he died, the supreme authority was assumed by the primate, who, on that account, was called Interrex. He issued circulars announcing the vacancy of the throne and summoning the diet of convocation. This diet was always confederated, that is, both the chambers, the senate, and the nuncios, or house of commons, deliberated together, and could not be dissolved by the *liberum veto*, and it was on that account also called the general confederation. It issued all the orders necessary for the maintenance of the public tranquillity and safety, and fixed the day for the election of the new king. As the courts of justice acted in the name of the king, their functions were suspended during the interregnum; but special tribunals for criminal cases were formed, and their authority continued till the coronation of the new king, who was crowned by the primate in presence of the diet.

The diet for the election assembled at Vola, in the vicinity of Warsaw, on a spot enclosed by a wall and a ditch: the senate assembled in a temporary building; the nuncios sat in the open air; the nobles, who were assembled from all parts of the kingdom, were encamped at a little distance from the enclosure. After divine service in the cathedral of Warsaw, the diet assembled, a marshal was chosen in the enclosure, and the two chambers were united. The primate then gave his blessing to the senators and nuncios, who joined the nobles of their respective palatinates, who were all on horseback, under the colours of their respective palatinates or provinces. The senators and nuncios proposed the candidates to the nobles of their palatinate or province, and they all voted equally; they collected the votes, and made a report of the result to the marshal of the diet. The primate, mounted on horseback, rode about to the assembled nobles, inquiring from them whether they consented to the election of the successful candidate. The new king was then proclaimed by the grand-marshal of Poland; and either himself or by his plenipotentiary swore to the *pacta conventa*, or constitutional guarantees. The diet then separated.

The diet of coronation assembled at Cracow to witness that solemnity, which terminated the interregnum. The deputies of the towns of Cracow, Warsaw, Vilna, Posen, Danzig, Thorn, and Culm were admitted to the diets of convocation, election, and coronation.

The ordinary diets took place every two years; but in case of necessity, extraordinary diets could be convened. Each diet was preceded by elections, made by royal letters-patent, which contained propositions for the future diet. The nobles or electors assembled for the election in meetings called in Polish *Seyniski*, that is, little diets (in Latin, *Comitiola*); they returned the members, and gave them instructions with respect to the royal propositions, as well as other subjects, which the members were obliged to follow, unless they were empowered to act according to their own views.

The senate and the chamber of nuncios, having assembled at the appointed day in the cathedral church of Warsaw, proceeded, after divine service, with the king to the hall of the senate. Several formalities were observed expressive of respect to the king, who did not speak himself; and the congratulatory address of the chambers was answered by the chancellor, who also read the propositions from the throne, which were only a repetition of what had previously been submitted to the body of electors. The chamber of nuncios assembled under the presidency of the marshal or speaker of the last diet, and began their deliberations by electing a new marshal.

Both chambers formed a secret committee to hear the report of all the measures of the government since the last diet. The *pacta conventa* were read, and each nuncio had a right to make his observations, if he thought that any of their provisions had not been observed. The chambers, having separated, appointed committees to examine the reports of the different departments of government.

The propositions of the king, as well as the motions of the nuncios, were publicly debated. A bill could not be carried except by the unanimous vote of the chamber of nuncios. The bill was read by the secretary of the diet, and the marshal inquired three times whether any member opposed it: if there was no opposition, the bill became a law, and was called *constitutio*. It was afterwards read in the united chambers of the senate and the nuncios, where it was signed. The nuncios were obliged to render an official account to their constituents of their parliamentary conduct, for which meetings were convened.

The king presided in the senate, which acted as a judicial tribunal, at the time when the chamber of nuncios deliberated about the propositions of the king. The senate formed a council of state, and without their consent no royal proposition could be made; consequently a proposition of the king required the approval of the senate, and had only to receive the sanction of the third estate, that is, of the chamber of nuncios. A motion which originated in the chamber of nuncios, or a royal proposition which was amended in the same chamber, was submitted to the king and the senate for their approbation; but the power of the chamber of nuncios at last became so great, that the consent of the king and the senate was never refused. There was always with the king a council of twenty-eight senators, and the whole senate was frequently called together in order to issue ordinances on points for which the fundamental laws of the country did not provide. These were called *senatus consulta*. The senators were appointed by the king for life, unless advanced from a lower rank to a higher, as for instance from a castellan to a palatine. The bishops were also nominated by the king. The senate was composed of two archbishops, fifteen bishops, thirty-three palatines, eighty-five castellans, one starost of Samogitia, who, as well as the castellans of Cracow, Vilna, and Troki, had seats among the palatines. The castellan (not the palatine) of Cracow was the first temporal senator. Forty-nine of the castellans were called minor senators, and had seats on benches, while the others occupied chairs; but their votes were the same as those of other senators. The number of nuncios was 184, besides those of Prussia, whose number was not definite, and who only deliberated when the affairs of their province were concerned.

The nobles, or the equestrian order, were the ruling class in Poland: all legislative power was in their hands, and none who were not born of noble parents could be invested with any civil or military office, or promoted to the higher preferments in the church. No noble could be imprisoned before he was convicted, unless he was taken *in flagrante delicto*. If however he did not appear before the tribunal when cited, he was declared infamous. The house of a noble, as well as his estates, was free from military quarters. He had the power of life and death over the persons on his estates, but this power was abolished in 1764. The house of a noble, as well as of a clergyman, was an asylum. If a foreigner died without issue on an estate belonging to a noble or the clergy, his property devolved to the landowner or the clergy. The nobles were exempted from all taxes. The nobles of antient descent enjoyed all these privileges; but the newly-created nobles, called scartabelli, could not fill offices before the third generation. A noble enjoyed all civil rights when he was possessed of landed property, or was, according to the legal expression, *natus et possessionatus:* the amount of his property might be very small; and the diet of 1768 abolished even that qualification, and established universal suffrage in that class. A noble lost his privileges by carrying on a retail trade, but he recovered them by abandoning the occupation. His privileges were also forfeited by the commission of certain crimes. Each noble was obliged to join on horseback the Pospolite Ruszenie, or arrière ban, with a certain number of followers, determined on the occasion by the king and his council, and proportionate to the extent of his land Those who held crown or ecclesiastical lands on lease were obliged to do the same. A noble who was condemned to imprisonment, was released from his prison during the campaign, but returned to it for the remainder of his term of imprisonment. A noble who did not appear at the time and place fixed, was liable to have his property confiscated, and to lose his honours. In general the martial law which was in force during a campaign was extremely severe. The palatines commanded the arrière bans of their palatinates or provinces, and the castellans those of their districts. There were in each district several permanent officers, who were employed on such occasions.

The king was the head of the state, and had the supreme executive power. He also constituted an estate in the legislative body, which was composed of the king, the senate, and the chamber of nuncios. All judicial and public proceedings were in his name. He had the power of pardon, and the nomination to all dignities and offices, ecclesiastical, civil, and military, with the exception of those which were elective; he granted the starostees, or crown estates. Without the consent of the diet, he could not make laws, impose taxes, declare war, conclude peace, or form any treaty, contract a matrimonial alliance, or leave the country.

The diet of 1775, a continuation of the same which confirmed the first dismemberment of Poland, took away the little authority which the king possessed, by establishing a permanent council of 36 members, consisting of 3 bishops, 11 temporal senators, 4 ministers of state, and 18 nuncios. The king, who was the president of this body, could do nothing without the assent of the council, which was determined by a majority of votes. The ministers of state were 2 grand-marshals, 2 court-marshals, 2 chancellors and 2 vice-chancellors, and 2 treasurers. They were all appointed by the king, who could not dismiss them, as their places were for life, unless they were advanced to a higher rank or resigned voluntarily. The ministers might also be senators. Of all these dignitaries, one was for Poland and one for Lithuania. The grand-marshal was the governor of the royal court, and the first officer of state. He convoked the diets by the order of the king, and during the interregnum by that of the primate. He maintained the public peace during the diets, received foreign ambassadors, proclaimed the new laws, and the sentence of the king in cases of capital punishment. It was also his office to preside over public ceremonies, and to maintain the police in the royal residence. In public solemnities he preceded the king, with a staff, the badge of his dignity. During the absence of the grand-marshal, all those duties devolved upon the court-marshal. When the king resided in Lithuania, the officers of that duchy discharged the same duties.

The chancellor and vice-chancellor differed only in name and precedence; their authority was the same. They gave a legal sanction to the documents issued by the king, by affixing the seals to them. They were also judges in several cases, civil and ecclesiastical, and one of them was always a clergyman. The treasurers presided over the financial departments, and they had a seat in the senate. The other great officers of state, who had not a seat in the senate by virtue of their office, were the grand and field hetmans, or generals of Poland and Lithuania. They kept their offices for life, unless the field-hetman was advanced to the dignity of grand-hetman. This made them independent of the king, and was very injurious to the royal authority; for though appointed by the king, he could not dismiss them. There was also a great number of court dignities for Poland and Lithuania, as great chamberlain, cup-bearers, masters of the stable, &c. Each district had a number of dignitaries with the same names as those of the court but their offices were nominal. These last-mentioned dignitaries were established in those times when the kings in their journeys about the country lived at the expense of the inhabitants, and were served by those local court officers. The starosts (*capitanei*) were of two kinds: starosts with a jurisdiction, capitanei castrenses, who were set over castles and towns, and presided in local courts for criminal and police affairs; and starosts without jurisdiction, who were only holders of starostees, or crown estates, which were granted them on payment of a small annuity.

The confederation was an association formed by the nobles for the defence of their rights. It was generally formed by a few individuals, who met together, and after having composed the act of confederation, which expressed the object that they had in view by forming that association, they issued circulars, by which they invited all the nobles to join their confederation, elected a marshal or chief, and counsellors, or members of the government which they pretended to have a right to exercise, and really did exercise, when their strength was equal to the object. Such confederations frequently added to the disorder of the country, but sometimes they proved the means of its salvation, as was the case with the confederation of Tyszowce in 1656 which freed the country from foreign invasion, and restored John Casimir to his throne. A Rokosh was a general meeting of the armed nobles to represent their grievances and to obtain redress. Such a meeting was legal, when the king, disregarding the admonitions of the senate, persisted in violating the pacta conventa, or the compact between the king and the nation. It was founded on the following clause, which was inserted, for the first time, in the pacta conventa of Henry of Valois (1573): 'Et si quod absit, in aliquibus juramentum meum violavero, nullam mihi inclytæ regni omniumque dominiorum utriusque gentis (Poles and Lithuanians) obedientiam praestare." This clause was better defined by the diets of 1607 and 1609, when it was enacted, in the article 'de non praestanda obedientia,' that an armed opposition to the king might be made only when all constitutional means had been employed in vain, in order to bring him back to his duty, and that otherwise it was treason. Two instances of Rokosh happened in Poland, in 1525 and in 1607.

The courts of justice of the first instance were the territorial courts for civil affairs, composed of elected judges, and castle tribunals for criminal affairs, the judges of which were the starosts (capitanei castrenses) appointed by the king. The courts of appeal, which decided in the last instance, were the tribunals of Poland and Lithuania, instituted by king Stephen Battory. They were composed of deputies, elected annually from the nobles and the clergy, and all matters in which the ecclesiastical came into collision with the temporal courts were decided by these tribunals. The tribunal of Poland sat at Piotrkow for the affairs of the provinces of Greater Poland and Russia, and for the affairs of the province of Little Poland at Lublin; that of Lithuania met at Grodno and Vilna.

The towns were governed by the German municipal law, called the Magdeburg code. This law was introduced at a very early period, and till the reign of Casimir the Great (A.D. 1333-1370) the appeals were carried to Magdeburg. But Casimir abolished the appeal to a foreign tribunal, and established a supreme court of appeal for the towns at Cracow. In later times the affairs of the towns were decided in the last instance by the assessorial tribunal, at the head of which was the chancellor or vice-chancellor: it consisted of the referendarius and other high magistrates, as well as of two senators appointed by the king and four nuncios chosen by the diet.

The referendarial tribunals, which had jurisdiction without appeal, took cognizance of all affairs relating to the royal demesnes. The tribunals of the diet, which were presided over by the king himself, judged in all cases of high treason, and in cases of accusations against ministers, tribunals, and other high authorities.

The constitution of 1791 established the hereditary character of the throne and the abolition of the veto, but it did not sufficiently extend the royal authority, and it may be said that it prepared rather than accomplished great reforms.

Poland was politically divided, previous to its dismemberment, into three provinces, Great Poland, Little Poland, and Lithuania, each of which had sometimes its provincial diets. Great Poland contained the palatinates of Posnania, Kalisch, Sieradz, Lenczyca, Brest of Cujavia, Inovroclav, Plotzk, Mazovia. Little Poland, which, from successive acquisitions from the Russian provinces, was much more extensive than Great Poland, contained the palatinates of Cracow, Sandomir, Kiew, Russian Volhynia, Podolia, Lublin, Belz, Podlachia, Braclav, besides the principalities of Zator, and Osviecim. Lithuania contained the palatinates of

Vilna, Troki Minsk, Brest, Mstislav, Novogrodek, Polotsk, Witepsk, and the principality of Samogitia. The province of Prussia, containing the palatinates of Culm, Marienburg, and Pomerania, had a local legislature, although the deputies of that province took part in the deliberations of the Polish diet in cases where their province was concerned. The bishops, palatines, and castellans of that province belonged to the Polish senate.

POLAND—*Language and Literature*. [SLAVONIAN LANGUAGE AND LITERATURE.]

POLAR BEAR. [BEAR.]

POLAR SEAS is a term generally used to indicate those portions of the ocean which extend from the polar circles to the poles themselves. As the ocean in these parts is generally encumbered by large fields of ice, and the air is frequently loaded with dense and heavy fogs, the navigation is extremely perilous, and was for a long time avoided by the most adventurous seamen. But the experience of the whalers, during the course of two centuries, showed that these seas could be navigated with a certain degree of safety, if the seamen united boldness with care and precaution, and to this experience we owe the great discoveries which have been made in those seas during the last twenty-five years.

In the middle of the last century, geographers, founding their reasoning on some imaginary law of equipoise, were of opinion that a continent of great extent must surround the southern pole; and they supposed that what at present is called Australia was the northern portion of that continent. The question thus raised was to be decided by Captain Cook in his second voyage (1772, 1774). That bold, experienced, and cautious seaman sailed as far as circumstances permitted him along the fields of ice which enclose the southern pole to a distance of more than 20°, but he did not fall in with even an island of any extent, though he frequently passed south of the southern polar circle, and at one place advanced to between 71° and 72° S. lat. Thus the question of a southern continent seemed to be decided. Modern navigators however have discovered several groups of islands in that part of the Southern Polar Sea, where it was supposed that none existed, opposite the southern extremity of America, and the most recent discoveries lead to the conclusion that this part of the ocean contains an island of considerable extent. For an historical account of these discoveries, and a few observations on these countries, see SOUTHERN POLAR COUNTRIES.

That part of the globe which lies within the north polar circle comprehends the most northern portions both of the old and of the new continent; and the term North Polar Sea, or Arctic Ocean, is applied to that part of the sea which divides the northern coasts of Europe and Asia from those of America. Both continents terminate towards the north pole, near 70° N. lat., in America and Europe rather south, and in Asia rather north of that parallel, which consequently may be considered as the general boundary-line of the North Polar Sea. This sea is united to the Pacific by the narrow Strait of Behring, which divides the most north-western part of America from the north-eastern projection of Asia, and in the narrowest part, between East Cape in Asia and Prince of Wales Cape in America, hardly exceeds 18 miles in width. The sea by which it is united to the Atlantic is as wide as the average width of the last-mentioned ocean, and hence the North Polar Sea is frequently considered as the most northern portion of the Atlantic. The eastern entrance of the Fury and Hecla Strait, whose southern shores constitute the most western portion of the northern coast of the American continent (between 69° and 70° N. lat.), are 2212 miles from the coast of Norway, between 69° and 70° N. lat., or not quite 300 miles more than the town of Halifax in Nova Scotia from Valentia in Ireland.

That part of the Arctic Polar Sea where it borders on the Atlantic contains one of the largest archipelagos on the globe. The middle of it is occupied by Greenland, which may be considered as the main land of the archipelago. Its northern parts are buried under enormous masses of eternal ice. On the east of it is the extensive group of islands known under the name of Spitzbergen, the small island of Jan Mayen, and Iceland. On the west of Greenland, and divided from it by Davis's Strait and Baffin's Bay, there is a considerable number of islands of great size, with whose outline we are imperfectly acquainted, and whose number, according to the latest discoveries, has been increased by two new islands. The most southern of these islands approach so near the northern coast of America, as to leave in three places only comparatively narrow but long straits between them and the continent. The most eastern of these straits is that of the Fury and Hecla, which separates Cockburn Island from Melville Peninsula, and was discovered by Captain Parry in 1822. Farther west is Dease's Strait, discovered in 1839, by Dease and Simpson, which extends between the continent and an island, to which no name was given by the discoverers, because they supposed it to constitute the southern coast of an island which Captain James Ross had visited in 1830. This newly discovered strait is 10 miles wide at each extremity, but contracts to three miles in the centre. There is deep water in the middle throughout. Its length seems to be about 25 miles. Farther to the west is a much wider strait, which is likewise nameless, and may be called Simpson Strait, in honour of the companion of Mr. Dease. It separates the island called Victoria Land from the northern coast of America, and was discovered in 1838 by Dease and Simpson. The most western of these straits, called Dolphin and Union Strait, divides from the American continent the island or islands called Wollaston Land, which were discovered in 1826 by Dr. Richardson. West of this strait, or west of 117° W. long., no islands approach the continent of America. If a line is drawn from the western extremity of the Dolphin and Union Strait (117° W. long.) through the pole, and continued towards the south, it cuts 63° E. long., or Cape Nassau, the most northern extremity of the Island of Novaïa Zemlïa. This line, which divides the Artic Polar Sea into two nearly equal parts, may also be considered as the dividing-line between the more and the less navigable portion of that sea. That portion of it which opens towards the Pacific by the Strait of Behring is always so encumbered with immense masses of floating ice, that the boldest navigators have not been able to advance farther north than 70° N. lat., where these floating masses constituted a barrier extending from the coasts of Asia to those of America. No vessels visit this sea for the purpose of taking whales. That portion of the Arctic Polar Sea which opens from the above-mentioned line into the Atlantic is still the principal resort of whalers, and is much more open to navigators. Between Spitzbergen and Greenland vessels have advanced as far as 81° N. lat. British whalers almost every year sail up to the most northern extremity of Baffin's Bay (77° N. lat.), and Parry in his first voyage succeeded in advancing westward as far as 117° W. long., but here he met an impenetrable barrier of ice. On the other side, the Russian navigator Ziwolka, who surveyed the island of Novaïa Zemlïa in 1836, found no difficulty in tracing the western coast to Cape Nassau, and even the eastern to 61° E. long.; but impenetrable masses of ice prevented his advance farther to the east. The very scanty knowledge which we possess respecting those cold regions does not enable us to assign any sufficient reason for this phenomenon; but one of the circumstances which seems to be active in producing this effect is probably the current which sets from south to north through Behring's Strait with great strength, and, passing through the sea, is very perceptible along the eastern coasts of Greenland. It seems however that the whole sea is in motion in the same direction; for Parry, in his fourth and last voyage, when he tried to get to the pole over the ice, was prevented from executing his bold design by the masses of ice which occur north of 81°, on the north of Spitzbergen, being carried by the current southward, so that he lost every day as much as he had gained by moving forwards: in fact he was advancing against the current. If a similar enterprise should ever be again undertaken, the attempt must be made in the opposite direction, where most probably the current would be favourable.

POLARITY signifies, in general, a disposition in a body or in an elementary molecule of a body to place its mathematical axis in some particular direction; frequently also it denotes in a body the existence, either naturally or induced, of two points possessing contrary properties.

If iron-filings be strewed over a mass of natural loadstone, it will be found that there are two points on its surface at which the filings are most abundantly attracted, and where they dispose themselves nearly in the direction of a line imagined to be drawn through the mass. [MAGNETISM.] Then, if the loadstone be cut in the form of a sphere, having this line for a diameter, the symmetrical arrangement of the iron-filings with respect to this line affords an indication that the particles of the loadstone may be symmetrically disposed about the line; and, from an analogy with the axis and poles of the earth, this line is called the axis of the loadstone, and its extremities are called the poles. If the mass of loadstone be cut in the form of a prism, the length of the latter being in the direction of the axis, and if the prism be suspended by its centre of gravity, it will be found to take one particular direction with respect to the horizon and the meridian of the observer. The two extremities of the prism so formed have received the denomination of poles, and the term is now applied to the opposite extremities of any body or molecule, when it assumes or can be brought into a particular direction.

What has been said respecting the properties of a prism formed of the natural loadstone, is true of a magnetised bar of steel [Magnet], and the poles or opposite extremities of either material are found to possess a contrariety of character. One extremity always tends towards the northern part of the horizon only, and the other towards the southern part; and if two such prisms or bars are formed, and suspended by their centres of gravity, on bringing the northern or southern pole of one near the like pole of the other, they exercise upon each other a mutual repulsion; but if either pole of one be brought near the opposite pole of the other, they mutually attract each other.

A piece of natural loadstone, if it could be removed beyond the influence of the magnetic power in the earth, would probably exhibit no signs of that attractive and directive power which we observe in it, the magnetic fluid, or whatever be the cause of the former, being then in equilibrio in the mass; and it may be conceived that the magnetic power in the earth by some means disturbs that equilibrium, forcing the fluid molecules which possess opposite properties, or are in contrary states, towards the opposite extremities of the mass. In magnetising a steel bar it is probable that the natural magnetism is decomposed in a similar manner. Since in magnetised bars the poles of contrary names attract each other, and that the earth may be considered as a body possessing boreal magnetism towards the north, and austral magnetism towards the south, it is evident that the magnetism which exists in the northern extremity or pole of a suspended bar (as a compass needle) must be *austral*, and that which exists in the southern extremity must be *boreal*.

If a cylinder of wood or metal be insulated on a glass stand, and it be then brought near a body which has been electrified by the usual machine, it will be rendered polar; that is, one end will possess the vitreous or positive electricity, and the other the resinous or negative electricity, and near the middle the cylinder will be in a neutral state. These conditions may be rendered evident on electrifying a pith ball, insulated by means of a silk thread, and presenting it to the cylinder, when it will be attracted towards one end and repelled from the other. It appears, from the effect of the cylinder on the electrified ball, that the particles of fluid of the same kind repel each other, and those of unlike kinds attract each other.

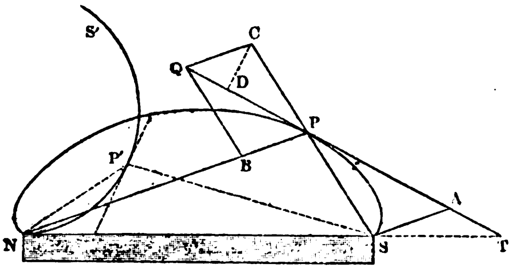
Polarity is also obtained by what is called galvanism, which indeed differs from electricity only in the manner in which a change in the electrical condition of a body is produced; in the latter case friction is employed for this purpose, but in the former it results from the contact of metals susceptible of different degrees of oxidability. In an ordinary battery, the fluid, by chemical action on the zinc, produces a separation of the two kinds of electricity; that which is called positive is carried to the copper plate, and the latter communicates it to the zinc plate with which it is connected. This action is repeated at every pair of plates in the battery; and from the last zinc plate the electricity enters the conducting wire, or that which is employed to connect the opposite extremities of the battery: thus the zinc extremity constitutes the positive pole of the battery. At the same time an opposing current of negative electricity passes from the copper, through the fluid, to the zinc, from thence to the next copper plate, and so on to the last, which is in connection with the conducting wire at that extremity of the battery: this copper end is called the negative pole of the battery.

The attractive power in a magnetised steel bar increases from each extremity to about one-quarter of an inch from thence, where it is the greatest, and it then diminishes gradually towards the centre; this distribution is similar to that of the induced electricity in the insulated cylinder. But experiments show that if a prism of loadstone or a magnetised bar be divided into several parts perpendicularly to its length, each part is a complete magnet, having poles of contrary denominations at its extremities; and this condition is accounted for by Coulomb in the following manner:—He supposes that every molecule of loadstone is a small magnet possessing opposite polarities at its extremities, the axes of all being parallel to or coincident with the magnetic axis of the mass; and that a similar disposition of the molecule is induced in a bar of steel when the magnetic power is communicated to it. The austral polarity of each molecule, while in the mass, is destroyed by the boreal polarity of that which is contiguous to it in the common directions of their axes; but on separating, as above, the parts of the loadstone or magnetised bar, that extremity of each which is farthest from the northern pole of the bar exhibits the austral magnetism appertaining to the like extremities of the molecules; and that extremity which is nearest exhibits boreal magnetism.

A magnetised steel bar, when tried by means of a small compass-needle, is often found to exhibit, at different places in the direction of its length, a change from boreal to austral magnetism, and the contrary. These places are called consecutive poles.

Effects precisely similar to those which have been mentioned are also found to exist in the crystals of tourmaline and Siberian topaz when their electrical properties are developed by heat. The crystals of tourmaline are of a prismatical form with an uneven number of faces, and they are terminated at each extremity by a small pyramid; the polar axes being coincident with what may be called the geometrical axes of the prisms. The crystal being heated to any degree between about 100° and 212° (Fahrenheit), it is found that its extremities possess opposite kinds (positive and negative) of electricity; about the middle there is a space in which the electricity is insensible; and when the crystal is broken across, each fragment exhibits the like phenomena. (Hauy, *Minéralogie*, tom. i.) Boracite, which crystallises in cubes, is found to have four polar axes, the extremities of which possess opposite kinds of electricity when heated. These are nearly in the directions of the four diagonals of the cube.

The intensity of the force, either of attraction or repulsion, exercised by one of the poles of a magnet on any body is inversely proportional to the square of the distance of such body from that pole; and if a very small compass-needle, supported or suspended in the usual way, be brought near a magnetised bar, it must settle, between those opposing forces, in the direction of a tangent to some curve line passing through the two poles of the magnet. This is called the magnetic curve, and the direction of the tangent at any given point may be thus investigated:—



Let N be the north and S the south pole of a magnet; let P be any given point at which the centre of gravity of a small suspended needle may be placed, and join PN, PS. Let the attraction of N on P be expressed by $\frac{1}{PN^2}$ and be represented by PB; also let the repulsion exercised by S on P be expressed by $\frac{1}{PS^2}$ and be represented by PC, in the direction of SP produced. Imagine the parallelogram CB to be formed; then, by mechanics, PQ, its diagonal, will represent the resultant of the forces acting on a particle at P; it will therefore be the direction of the needle and of a tangent to the curve at that point. Let $\angle QPC$ be represented by θ; $\angle QPB$ by θ', and let fall CD perpendicularly on PQ: then by trigonometry, $\frac{\cos.\,\theta}{PS^2}$ is the value of PD, or the equivalent of the force represented by PC when reduced to the direction PQ; and $\frac{\cos.\ \theta'}{PN^2}$ is the value of QD, or of the force PB (=QC) when reduced to the same direction. The sum of these, or $\frac{\cos.\ \theta}{PS^2} + \frac{\cos.\ \theta'}{PN^2}$, is the value of PQ, and represents the whole force of the magnet on the point P in the direction of that line: hence,

$$PQ^2 = \frac{\cos.^2\ \theta}{PS^4} + \frac{\cos.^2\ \theta'}{PN^4} + 2\frac{\cos.\ \theta \cos.\ \theta'}{PS^2.\ PN^2}.$$

But, by geometry, $PQ^2 = PC^2 - QC^2 + 2PQ.\ QD$; which, by substitution becomes $\frac{1}{PS^4} - \frac{1}{PN^4} + 2\left(\frac{\cos.\ \theta}{PS^2} + \frac{\cos.\ \theta'}{PN^2}\right) \frac{\cos.\ \theta'}{PN^2}$. Equating these values of PQ^2 and leaving out terms which destroy each other, we have $\frac{1}{PS^4} - \frac{\cos.^2\ \theta}{PS^4} = \frac{1}{PN^4} - \frac{\cos.^2\ \theta'}{PN}$; whence $\frac{\sin.\ \theta}{PS^2} = \frac{\sin.\ \theta'}{PN^2}$, and $\sin.\ \theta : \sin.\ \theta' :: PS^2 : PN^2$.

Now, produce QP till it meets NS, produced, if necessary, in T; and draw SA parallel to NP: then, by trigonometry,
SA : PS : : sin. APS : sin. PAS : : sin. QPS : sin. QPN; that is,

$$SA : PS :: \sin.\ \theta : \sin.\ \theta';\ \text{hence}$$

$SA : PS :: PS^2 : PN^2$, which being compounded with the identical proportion PS : PN : : PS : PN gives

$$SA : PN :: PS^3 : PN^3.$$

But SA being parallel to PN, SA : PN : : ST : NT; therefore $ST : NT :: PS^3 : PN^3$.

Thus the ratio of ST to NT is known; and, consequently the position of the tangent PT, from the given position of P. If the poles N and S are unlike, as above supposed, the curves are of the kind called convergent, as NPS; but if the poles are similar, the curves will be divergent, as NP′S′.

An analogy has long been known to subsist between electricity, galvanism, and magnetism, in respect of the power of imparting polarity to bodies and of modifying each other's effects. Coulomb found, in 1802, that needles of gold, silver, copper, lead, and even wood, when about one-third of an inch long and one-fiftieth of an inch thick, if suspended between the opposite poles of two strong magnets, presently arranged themselves in lines joining those poles. (Biot, *Traité de Physique*, tom. iii.) Sir Humphry Davy, Mr. Faraday, and other philosophers, both in this country and abroad, succeeded in exciting magnetism in steel bars by the galvanic battery; and gold needles galvanised have been found to acquire polarity, and to be subject, with respect to the horizon and the meridian, to a certain variation and dip, different however from those of a steel bar when magnetised.

A small piece of steel-wire may be magnetised, or made to acquire polarity in a short time, by merely placing it perpendicularly across the conducting wire of a galvanic battery in action; and it will be found that one end of the steel attracts either the north or south pole of a compass-needle according as it is placed above or below the conducting-wire. But the method employed by M. Ampère to magnetise needles was to twist a wire spirally about a cylinder, and to place the needle in a glass tube within the spiral; then, connecting the two extremities of the spiral with the poles of a galvanic battery, the needle was found, after a few minutes, to be strongly magnetised. When the spiral was formed from the right hand downwards, to the left, above the axis, that extremity of the needle which was nearest to the negative end of the battery pointed towards the north, and the extremity nearest to the positive end towards the south; and when the spiral was formed in the contrary direction, the extremity of the needle which was nearest to the positive end of the battery pointed towards the north. By this method a great intensity of magnetic power is produced; the action of the wire upon the needle being repeated as many times as there are revolutions of the spiral about the latter.

In 1820, M. Oersted observed that if a magnetic needle, suspended as usual, be placed under and near the wire connecting the opposite poles of a galvanic battery, the pole of the needle which is nearest to the negative end of the battery declines westward; and if the needle be placed above the wire, that pole declines eastward. The amount of the deviation depends on the distance of the wire from the needle; and when the distance is about three-quarters of an inch, it amounts to about 45°. When the wire is in the same horizontal plane as the needle, the latter suffers no deviation; but, if on the western side of the needle, the pole of the latter, which is nearest to the negative end of the battery, becomes depressed; and if on the eastern side, that pole becomes elevated. The hypothesis proposed by Oersted and Ampère to account for the action of the wire on the needle is, that a current passes along the conducting wire of a galvanic battery from each pole towards the middle; and that these currents, on meeting, turn each other from their rectilinear directions, so that both are compelled to move spirally in opposite directions round the wire. In thus revolving, they act upon the magnetic particles in the needle, or upon the electric currents supposed to circulate about them, producing changes in the positions of those particles, and thus turning the needle from its place. It was a discovery of Biot, that if a perpendicular line were let fall from any point in a magnetised needle to the conducting wire of a battery, the electric force acting on that point is perpendicular to the line and to the axis of the wire; and if the magnetic particles in the needle were free to move under the impulses communicated to them by the electrical currents about the wire, it is supposed that those particles would arrange themselves so as to place their axes in planes coincident with those of the electric currents, and at right angles to the lines let fall from them perpendicularly on that axis. Such were found by Mr. Barlow to be the dispositions assumed by very small magnetised needles when placed in any positions near the conducting wire; the effects of terrestrial magnetism on them being neutralised by means of magnets properly placed for the purpose.

POLARIZATION OF LIGHT is the effect of an attraction exercised by the particles of what are called *doubly refracting* crystals, or of certain reflecting surfaces, upon the particles of light when these pass through the former, or are incident upon the latter at a particular angle. By those attractions the particles of light, considered as not perfectly spherical, are supposed to suffer such changes of disposition that their axes, or their homologous faces, become parallel to one another, or are directed towards the same part of space. This supposition may be admitted, if we consider the particles of light to be transmitted in rectilinear directions from a luminous body; but if we adopt the undulatory hypothesis, a different explanation must be given. In this case, understanding that the vibrations of the ethereal particles in waves of common light may take place in any manner (suppose in the direction in which the wave is advancing, in some direction oblique to that line, or even in directions which are continually varying); the polarization of that element may be stated to consist in such a resolution of the attracting forces exerted upon light by the molecules of the refracting medium or the reflecting surface, in consequence of their particular dispositions, that the vibrations of the particles of light in the direction of the wave's motion vanishing, the resulting vibrations shall take place in a plane perpendicular to that direction, and in lines parallel to one another. A plane perpendicular to all the lines of vibrations is called the plane of polarization.

Huygens was the first who discovered that when a pencil of light falls upon a prism of Iceland spar in any direction except one, it divides into two pencils in passing through it, and presents to the eye a double image of the object from whence the pencil proceeds; he observed also that one of these images was formed by a refraction of the usual kind, that is, having the usual relation between the sines of the angles of incidence and of refraction, and that the other was not so formed, the ratio of the sines not being constant. He called the pencil by which the first image was formed the *ordinarily* refracted ray; and the other the *extraordinarily* refracted ray. Iceland-spar crystallizes in the form of a rhomboid, and Huygens discovered that if the rhomboid is cut so as to form a plane face perpendicular to the axis (a line making equal angles with the three natural faces or planes of cleavage which form one of the obtuse solid angles)—when the pencil of incident light falls on the rhomboid in the direction of this line, it is wholly refracted in that direction, or the ordinary and extraordinary pencils are coincident. In all other positions the pencils are separated; and the angle between them is a maximum when the incident pencil is perpendicular to a plane cut in any position parallel to the axis. When the incident ray is perpendicular to one of the natural faces of the rhomboid, the angle between the two refracted pencils is equal to 6° 40′, and the line joining the images of the object is nearly in the direction of the shorter diagonal of that face.

Huygens also observed, that if the two pencils formed by one which had been made to fall perpendicularly on a natural face of the rhomboid of Iceland spar are suffered to fall upon a second rhomboid placed so that two like natural faces are parallel to or in contact with each other, each of the first refracted pencils is not divided into two, but in passing through the second rhomboid the *ordinarily* refracted pencil suffers only the ordinary refraction, and the *extraordinarily* refracted pencil suffers only the extraordinary refraction. The same thing takes place when, keeping the same faces in contact, one of the rhomboids is turned about through an angle of 180°, so that the ends are reversed. But the same faces being in contact, when one of the rhomboids is turned either way so as to be at right angles to its first position, each pencil, after passing through the first rhomboid, though it suffers only one refraction in the second, changes its character; that which was before *ordinarily* refracted, now becomes *extraordinarily* refracted, and the other becomes *ordinarily* refracted. In all other positions of the rhomboids each of the two pencils is divided into two in passing through the second; the angle between them varying according to the position of the rhomboids with respect to each other.

The circumstances just mentioned show that the ordinary and extraordinary pencils, in passing through one rhomboid, acquire properties of a like kind with respect to two planes passing through the incident pencil at right angles to one another. If one of these planes pass through the axis of the crystal perpendicularly to one of the natural faces, the properties of the ordinary pencil have the same relation to this plane which those of the extraordinary pencil have to a plane passing through the incident pencil perpendicularly to the same plane: or the particles in the ordinary refracted wave always vibrate perpendicularly to the first, which is called the principal plane, and those in the extraordinary refracted wave always vibrate perpendicularly to the second plane. Therefore it is said that the ordinary pencil is polarized in the principal plane of the crystal, and the extraordinary pencil is polarized in a plane perpendicular to the principal plane.

Double refraction is now known to take place in many crystals; and the line in which the ordinary and extraordinary pencils coincide is called the optical axis, or the axis of double refraction. In Iceland spar it nearly coincides with the shorter diagonal of the rhomboid; but in quartz, tourmaline, and other prismatic crystals it coincides with the geometrical axis of the prism. All these are called uni-axal crystals, though every line which can be drawn in the prismatic crystals parallel to the geometrical axis has the property of uniting in one the ordinary and extraordinary pencils.

Some crystals have two and others three axes of double refraction; and Dr. Brewster, who discovered the fact (in 1816), found that the two images were united in the bi-axal crystals, in the directions of both axes.

If the light of a candle be viewed through a thin and polished plate of tourmaline, whose surfaces are parallel to the geometrical axis of the prism, which, by crystallization the body forms, the plate being held perpendicularly to a line drawn from the candle to the eye, that light will appear equally distinct in every position of the plate. But, the plate being fixed, if the pencil from the candle be made to pass through a second plate parallel to the former, and the second plate be turned round in its own plane, the image of the candle will vary in brightness according to the relative positions of the two plates. If the axes of the plates (lines in them parallel to the geometrical axes of the prisms from which they are cut) are parallel to each other, the brightness of the image is a maximum, and if the axis of one is at right angles to that of the other, the image vanishes; the light diminishing in intensity from the former position of the axes to the latter in each quadrant of the revolution of the second plate.

In 1810 M. Malus, a Colonel of Engineers in the French service, communicated to the Institute of France the discovery that when a pencil of light is reflected at some particular angle from the surfaces of transparent bodies, solid or fluid, and also from certain opaque bodies, as black marble and ebony, it becomes polarized, like the pencils which are transmitted through a doubly refracting crystal. Thus, if a pencil fall upon the surface of unsilvered plate-glass at an angle of about 54° 35′ with a perpendicular to that surface, and the reflected ray be transmitted through a rhomboid of Iceland spar, whether the principal section of the rhomboid be parallel to the plane of reflection (plane of the incident and reflected rays), or whether it be perpendicular to it, the pencil suffers no *extraordinary* refraction; but in all other positions the pencil is divided into two in passing through the rhomboid, as if it had previously been refracted in a rhomboid of the spar. It may be observed that the polarization of the light takes place simultaneously at the upper and under surfaces of the glass plate: the pencil of light being incident on the former surface at the angle above mentioned, though it is obvious that the angle of incidence at which the pencil falls on the latter, is less than that at which the pencil fell, before refraction, on the upper surface.

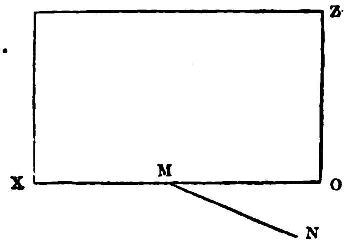
When the reflecting surface is water, the light is found to be polarized when the angle of incidence is 52° 45′; and it is found that when the tangent of the angle of incidence is equal to the refractive index (the quotient which arises on dividing the natural sine of the angle of incidence by that of the angle of refraction) of the glass or transparent medium from whose surface the light is reflected, the whole of the reflected light is polarized; just as the ordinary pencil produced by the first rhomboid of Iceland spar would be if its principal plane were parallel to the plane of reflection, and common light had passed through it instead of being reflected from the medium.

In the undulatory theory of Optics the phenomena of the reflection and refraction of common light may be satisfactorily explained by supposing a wave to diverge symmetrically every way about the point at which an agitation of the ethereal medium has taken place, the transparent substance in which a pencil is refracted being supposed to be uniformly elastic; and, consequently, it may be admitted that in common light the undulations are of a spherical form having the agitated point as a centre. But it is evident that if the molecules of the medium through which the vibrations of light are transmitted are not uniformly elastic, the particles of light will move with different velocities in different directions; and thus the waves will not be spherical.

It was an hypothesis of Huyghens that the extraordinary refraction in Iceland spar arose from a propagation of the light composing the pencil in spheroidal waves; but to M. Fresnel is due the investigation of a general equation for the form of a wave, or, as it is called, the surface of elasticity in that medium. The research is founded on the supposition that the arrangement of the particles in the crystal is such that, while the attractions exercised by those particles on any one of the luminiferous particles in a wave have for their resultant a force which is not in general coincident with the direction of the vibrations of the latter in the wave, there may yet be three lines of direction at right angles to one another, and having a common point of intersection, in each of which, if a particle be displaced by its vibration in the wave, the resultant of the attractions shall be in the same line, and shall act in a direction opposite to that of the displacement. For a demonstration of this property in an elastic medium see the article Light in the 'Encyclopædia Metropolitana,' sect. 998, &c.

Now imagine three rectangular co-ordinate axes OX, OY, OZ to exist in the crystal, and suppose the crystal to be cut in the form of a rectangular parallelopiped, having one of its axes, as OZ, coincident with the axis of the crystal (supposed to be uni-axal). Let OX, OZ coincide with the plane of the paper, and let the constitution of the crystal be such that the attractive forces of its particles upon the luminiferous æther among them are equal in directions parallel to OX and OY, but different in directions parallel to OZ.

Fig. 1.



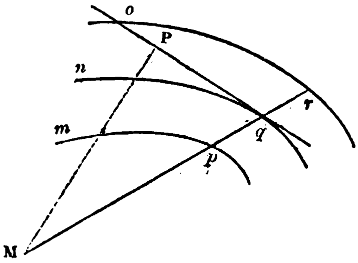
M. Fresnel considers that, whatever be the law of the attractions of the particles of crystal, the attraction exercised upon a displaced particle of light must be some function of that displacement; and that, in the direction of the co-ordinate axes, it may be represented by $a.X$, $a.Y$, and $b.Z$ respectively; where a and b (forces of elasticity) are constants depending on the positions of OX, OY, and OZ, with respect to the particles of the crystal; the force in OY being equal to that in OX, as above, by the nature of the crystal; also X, Y, and Z are the components, in the directions of the co-ordinate axes, of a displacement or extent of the vibration of a particle in any direction from O. Let this displacement be represented by D, and let the line of direction in which the particle vibrates from O make with OX, OY, OZ the angles α, β, γ respectively; then $X = D \cos. \alpha$, $Y = D \cos. \beta$, $Z = D \cos. \gamma$; and, if the attractions in the co-ordinate axes be reduced to one in the line of vibration drawn from O, the whole attraction in that direction becomes $a D \cos.^2 \alpha + a D \cos.^2 \beta + b D \cos.^2 \gamma$. M. Fresnel then imagines a surface of elasticity (curve surface of a wave) to be constructed so that the variable radius from O may be proportional to the square root of the last expression; and, representing that radius by R, we have $R^2 = a D \cos.^2 \alpha + a D \cos.^2 \beta + b D \cos.^2 \gamma$. But, when R coincides with OX, we have $\alpha = 0$, and both β and γ are right angles; consequently, in that case $R^2 = a D$, which represent by A^2. Again, when R coincides with OY, we have $\beta = 0$, and both α and γ are right angles; consequently then, also, $R^2 = a D$ or A^2. Lastly, when R coincides with OZ, $\gamma = 0$ and $R^2 = b D$, which represent by B^2. Thus A, A, B may represent the three rectangular co-ordinate axes of the surface of elasticity; and the wave is therefore of a spheroidal form.

Now, let the plane front of an incident wave, perpendicular to the paper, fall upon the plane of the axes OX, OY, making with it an angle equal to OMN (which represent by θ), and cutting it in a line passing through M perpendicular to the paper. Then, considering only those vibrations of the particles of luminiferous ether in the front of the wave which take place in lines parallel to MN, and in lines parallel to that drawn through M perpendicular to the paper, that is parallel to OY; the latter vibrations are those which are immediately acted on in the same lines but in opposite directions by the force of elasticity in OY; that is, by the force $a Y$, which holds the place of $a D \cos.^2 \beta$, or of A^2 in the value of R^2 (since β is now $= 0$). The vibrations in lines parallel to MN must be resolved into vibrations parallel to OX and OZ; which, by mechanics, may be done on multiplying them by $\cos. \theta$ and $\sin. \theta$ respectively: so that, if D' be the displacement of a particle in MN, we have $D' \cos. \theta$ for the displacement in OX, and $D' \sin. \theta$ for that in OZ; and these being reduced to the direction MN become $D' \cos.^2 \theta$, and $D' \sin.^2 \theta$ respectively, which hold the places of $a D \cos.^2 \alpha$, $b D \cos.^2 \gamma$, in the value of R^2, since, when R is in the plane XZ, γ is the complement of α. Therefore the whole force of attraction on a vibrating particle in the direction MN may be represented by $A^2 \cos.^2 \theta + B^2 \cos.^2 \theta$, while the force in the direction perpendicular to MN and to the paper may be represented by A^2. But the radii of the surface of elasticity, by the hypothesis of M. Fresnel, are represented by the square roots of these terms; therefore A represents the radius in the direction parallel to OY on either side of M, and $\sqrt{\{A^2 \cos.^2 \theta + B^2 \sin.^2 \theta\}}$ represents that in MN on either side of the same point.

By the theory of undulations these represent the velocities with which two waves of light are propagated within the crystal in directions perpendicular to their fronts; and, being unequal, it follows that there will be two series of waves diverging from M, their directions depending on their velocities. The velocity represented by A being constant, this branch wave, whatever be the direction of the incident pencil, is of a spherical form and follows the law of ordinary refraction; that is, the sines of the angles of incidence and refraction bear to each other a constant ratio; the other velocity, depending on θ, differs according to the direction of that pencil; and hence arises the extraordinarily refracted pencil. Since each of these waves is formed by vibrations in directions parallel to one line, the ordinary wave by vibrations parallel to OY, and the other by vibrations parallel to MN, the light in each of the two refracted pencils is that which is called polarized light; and the lines of vibration OY and MN being perpendicular to one another, it follows that the planes of polarization for the ordinary and extraordinary pencils are also perpendicular to one another.

If M be the centre of the wave of extraordinary refraction, the fronts pm, qn, ro, &c., at any successive intervals of time will be similar, and the tangents at p, q, r, &c., in any line drawn from M, will be parallel to one another; then, if a line be let fall from M perpendicularly to any tangent qP, the distance MP will always be proportional to $\sqrt{\{A^2 \cos.^2 \theta + B^2 \sin.^2 \theta\}}$, where θ is the angle MqP, or NMO in the former figure. But by the nature of the ellipse, if A be the semi-transverse, and B the semi-conjugate axis, any diameter, as one parallel to Pq, making an angle equal to θ with the semi-transverse axis, is equal to

Fig. 2.



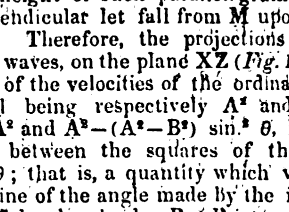
$$\frac{A.B}{\sqrt{\{A^2 \cos.^2 \theta + B^2 \sin.^2 \theta\}}};$$ and, since the parallelogram formed on two conjugate diameters is equal to A.B, it follows that, in an ellipse, $\sqrt{\{A^2 \cos.^2 \theta + B^2 \sin.^2 \theta\}}$ is equal to the perpendicular height of such parallelogram; that is, it is equal to a perpendicular let fall from M upon the tangent Pq, as above. Therefore, the projections of the plane surfaces of the waves, on the plane XZ (*Fig.* 1) are ellipses.

The squares of the velocities of the ordinary and extraordinary pencil being respectively A^2 and $A^2 \cos.^2 \theta + B^2 \sin.^2 \theta$, or A^2 and $A^2 - (A^2 - B^2) \sin.^2 \theta$, it follows that the difference between the squares of the velocities is $(A^2 - B^2) \sin.^2 \theta$; that is, a quantity which varies with the square of the sine of the angle made by the incident pencil with the axis of the rhomboid. But B is greater than A in Iceland spar, tourmaline, beryl, and many other crystals, in which case $A^2 - B^2$ is negative; and hence the crystals of this class have been called negative. When A is greater than B, as in quartz, ice, &c., the crystals are called positive. In the former case the velocity of the extraordinarily refracted pencil is greater than that of the ordinary pencil; or the refractive index for the ordinary pencil is greater than that for the extraordinary pencil. And, in the latter case, the velocity of the extraordinary pencil is less than that of the ordinary pencil; or the index of refraction for the ordinary, is less than that for the extraordinary pencil.

In polarized light the vibrations of particles in the direction of the wave's motion are insensible.

The rule discovered by Huyghens for finding the velocity of the extraordinary pencil is as follows:—In the negative crystals (Iceland spar, &c.) let AB be the axis in which the double refraction vanishes, and let CD be drawn at right angles to that axis; then, if a plane perpendicular to the paper pass through this line, the double refraction in such plane will be a maximum. Let m be the index of refraction for the ordinary, m' the index for the extraordinary pencil, and imagine a spheroid having its axes AB, CD inversely proportional to those indexes; that is, let AB $\left(= \frac{1}{m}\right)$ be the smallest, and CD $\left(= \frac{1}{m'}\right)$ be the greatest. Then the variable radii, On, &c. of the spheroid will represent the velocities of the extraordinary pencil when light is incident upon a sphere of crystal in the directions of such radii.

Fig. 3.



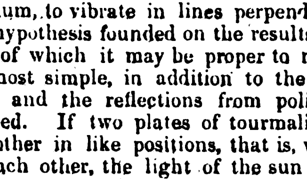
M. Biot, who discovered the class of positive crystals (in which m' is greater than m), showed that when AB is made the longer, and CD the shorter axis of the spheroid, the radii On still represent the velocities of the extraordinary pencil; and M. Fresnel has given the following more general rule: Imagine any ellipsoid, whose axes A, B, and C are reciprocals of the refractive indexes in those directions, to be cut by a plane passing through the centre; the lengths of the greatest and least radii in the section will be the lengths of the radii of the ordinary and extraordinary waves, and consequently the velocities with which those waves are propagated in the crystal when light is incident in a direction perpendicular to that section.

In crystals possessing three unequal axes of elasticity it is proved that the ellipsoid of elasticity admits of two circular sections, which are formed by diametral planes passing through the mean axis of the ellipsoid, and that these sections are equally inclined to the two other axes. The normals to these sections are the directions of no double refraction, or the optic axes of the crystal. And both Fresnel and Dr. Young have shown that if unity be divided by the squares of the two semi-axes of a diametral section of such ellipsoid, the difference of the quotients will vary with the product of the sines of the angles which the perpendicular to this section makes with the two normals to the circular sections of the ellipsoid.

That the polarization of light consists in its particles being made, by the attractions of the molecules of the polarizing medium, to vibrate in lines perpendicular to some plane, is an hypothesis founded on the results of numerous experiments, of which it may be proper to mention one or two of the most simple, in addition to the refractions in Iceland spar and the reflections from polished surfaces already noticed. If two plates of tourmaline are placed one on the other in like positions, that is, with their axes parallel to each other, the light of the sun or of a candle will be readily transmitted through them; and if, while the plates are in contact, one be turned round in its own plane, the light will gradually diminish till the axes of the plates are at right angles to each other, when none will pass through. Now these circumstances indicate that the luminiferous æther can pass freely through such plates only when the vibrations of its particles in them are performed in lines parallel or perpendicular to the axis of the plate; and that the cause of the light being arrested at the second plate, when its axis is perpendicular to that of the first, is the impossibility of the particles, while so vibrating in passing out of that first plate, finding a passage between the molecules of the other in that position of its axis. Hence it may reasonably be concluded that, by the attractions of the crystal molecules, the vibrations of the particles in the waves of incident light were brought to the directions above supposed.

Again, if two pieces of unsilvered plate-glass be placed so as to send the light of the clouds from C to the eye at E, after reflection at A and B, the angles of incidence and reflection at both being equal to the polarizing angle (54° 35′); then the pencil being polarised at A, if the glass B be so situated that the pencil BE is in the plane of reflection CAB (supposed to be perpendicular to both glasses and to coincide with the plane of the paper), the greatest quantity of light is reflected from that glass: but, the glass A remaining undisturbed, if the other be turned about the point B so that its plane, now oblique to the paper, may make always the same angle with the line AB; in proportion as BE, by such revolution of the glass, deviates from the plane of reflection CAB, the light reflected from the glass will diminish, and it will finally vanish or be absorbed when BE becomes perpendicular to the plane CAB. The loss of the light in the position last mentioned may be considered as an evidence that the vibrations of the particles in the polarized pencil AB, BE are, after reflection from A, rendered perpendicular to one plane, as CABE. Now the reflected pencil BE remains polarized till it vanishes entirely, which is when it is brought into a plane perpendicular to CAB; at this time the vibrations at B become perpendicular to their former direction, or parallel to the plane CAB; in which state the constitution of the reflecting surface is such as to absorb or disperse the light of that pencil. It appears therefore that light which has been polarized in one plane cannot produce polarized light in a plane at right angles to the former.

Fig. 4.



By a partially polarized pencil is meant one which, having been reflected once at an angle greater or less than the polarizing angle, when seen through a tourmaline plate capable of revolving in its own plane, or when received at the polarizing angle on another reflecting surface which, like the glass B above, may revolve upon the first reflected pencil without altering the inclination of the latter to it; the pencil thus seen through the tourmaline, or twice reflected, never vanishes entirely in consequence of such revolution of B, but merely undergoes variations of brightness and passes through several states of greatest and least intensity. It must be observed also that all the different colour-making rays of light are not polarized by reflection at the same angle; and hence it is that white light is not completely polarized when reflected from any transparent medium having a high dispersive power.

Rock crystal, which has the power of polarizing light, is also found to have the power of depolarizing it, or of reducing it to its ordinary state, when the polarized light is transmitted through it in one particular direction. This discovery was made by Dr. Brewster, who also found that the like property existed in Iceland spar, topaz, chrysolite, and several other minerals. Gum arabic, horn, and tortoise-shell were found to depolarize light in every position. Dr. Brewster also ascertained that, if a prism of Iceland spar were placed, either in a horizontal or a vertical position, upon a plate of mica or topaz, the plane of the latter being vertical, the light polarized by the mica suffered no change in passing through the spar; but when the spar was placed on the mica, at an angle of 45°, with a vertical or horizontal line, the polarized light was completely depolarized. Dr. Brewster therefore gave to these diagonal lines the name of *depolarizing* axes; and to those in vertical and horizontal directions, the name of *neutral* axes. When the Iceland spar was inclined to the vertical neutral axis of a plate of mica or topaz, in a plane perpendicular to that plate, at such an angle that the polarized light fell on it at an angle of 45°, the image, which was before invisible, reappeared; that is, the light became depolarized. This effect did not take place when the spar was similarly inclined to the plate in a plane passing through the horizonal neutral axis of the mica; but, on making the trial with the depolarizing axis, it was found that each of these last was accompanied by an oblique neutral axis. (Brewster on *New Philosophical Instruments*, book iv., ch. 4.)

The phenomena first observed by M. Arago in 1811, and called by him circular polarization, consist in the changes of colour undergone by the two images formed when a polarized ray is made to pass at right angles through a plate of rock-crystal cut perpendicularly to the axis of double refraction, and when those images are examined by a doubly refracting prism. On turning this prism half round, the *extraordinary* image, which at first was red, became successively orange, yellow, green, and violet; and on continuing the revolution of the prism, the tints recurred in the same order. The hypothesis proposed by the discoverer, in order to account for this effect, is that the several coloured rays, on emerging from the rock-crystal, are polarized in different planes. Again, if between the glasses at A and B (*fig.* 4) there be interposed a plate which possesses the property of double refraction, the image reflected from A appears generally bright, but at times covered by dark rays, and sometimes by complicated rings richly coloured; the arrangement depending on the direction of the pencils to some fixed lines in the interposed plate, as the latter is inclined. Now the light being polarized by A, the sets of waves enter the crystal with different velocities, and their union in passing through it produces a light not polarized, or not in the same planes as before; therefore they again became capable of being reflected from B. But since the positions of the two planes of polarization, as well as the difference in the velocities of the pencils, depend upon the directions of the paths through the crystal; the nature of the light produced by the union of the two emergent pencils, and consequently its intensity, will vary with the direction in which it enters the eye after reflection from B. Thus variously coloured spots and curves will be seen. (See Airy's *Math. Tracts*, *Optics*, Art. 144, &c.)

This branch of optics has been extended by Brewster, Biot, Fresnel, Young, Sir J. Herschel, and others; but it may be sufficient in this place to have indicated it.

Professor Forbes of Edinburgh has succeeded in polarizing radiant heat, both by reflection and refraction; employing, for the purpose of measuring the intensities, an instrument of such delicacy as to be capable of indicating an increment of temperature equal to about $\frac{1}{1500}$ of a degree of Fahrenheit's thermometer. The Professor has also depolarized heat; and since depolarization is a consequence of double refraction, it follows that the existence of a doubly refractive property in heat is thus demonstrated. [Undulatory Theory of Light.]

POLDERS. [Flanders Agriculture.]

POLE, POLAR. The word πόλος as applied to a point means a turning or hinge point, and was applied to the points at the extremity of the axis of the celestial sphere in the antient astronomy. Hence, on the hypothesis of the earth's rotation, it comes to mean the extremities of the axis on which the earth turns. From this primary meaning all the various uses of the word pole have been derived. For example, when it was found that the magnet did not always point to the north pole, but to another point, it was natural to call that other point the *magnetic* pole. Previously to this use of the word, it had already taken a wider signification, as follows:—On looking at the position of the equator with respect to the poles, it is obvious that if the equator, or circle of equal day and night, should be changed, the axis must also be changed, and the poles of rotation. Hence any great circle of the sphere is said to have its poles, meaning those points which would become poles of rotation if that circle became the equator. [Sphere.]

A term seldom passes through several significations, however nearly related, without at last becoming generic in the widest sense. The word pole is now used to denote any point which is of so striking a character as to require a distinct name. In physics the word is naturalised in magnetism, electricity, and optics; insomuch that any tendency towards a particular point, or even towards a particular direction, is termed polarity. In geometry, the only definition which can now be given of this term is, that it means any point which it is wanted to mean. Thus a point considered as the origin of Co-ordinates is called the pole; and when distances measured from the origin are among the co-ordinates, they are called polar. Again, it is a well known property of the conic sections, that if all possible chords be drawn through any one given point, and a pair of tangents be drawn from the extremities of each chord, the intersections of all the pairs will lie in one straight line; the point through which the chords are drawn is called the pole of that straight line.

POLE STAR. [Ursa Minor.]

POLE. [Perch.]

POLE, REGINALD, the celebrated Cardinal, was born in A.D. 1500, the same year which gave birth to the emperor Charles V. He was of very illustrious descent on the side of his mother, who was the daughter of George, duke of Clarence, brother to King Edward IV., and cousin-german to Elizabeth, queen of Henry VII. and mother of Henry VIII. He was a younger son, and received an education such as was given to those who were destined to high stations in the church, being placed when a child in the Carthusian monastery at Shene, from whence he was removed to Magdalen College, Oxford, where he had the benefit of the instruction of the celebrated Linacre. As early as 1515, he was made B.A., admitted into deacon's orders, and, when only nineteen, was made dean of Wimborne and dean of Exeter.

About 1520 he went abroad to pursue his studies in an Italian university, visiting Padua for that purpose. He returned to England in 1525, when he was received by the king in a manner befitting his rank and eminent attainments. But the gaieties of the court of Henry VIII. had fewer charms for him than the opportunities for seclusion and study which were afforded by the monastery at Shene, to which he retired. Times were however approaching when it was impossible for a man like Pole to be a mere spectator from the silent hold of a Carthusian monastery, nor could he think it right to be a mere spectator, mild and gentle, humane and pious as he was.

When the king had resolved on divorcing his queen and acting in defiance of ecclesiastical authority, Pole presented a strenuous opposition, and wrote his famous treatise *Pro Unitate Ecclesiastica*. This was a great disappointment to the king, who withdrew his pension, deprived him of his preferments, and procured that he should be attainted in parliament. The king had now entered on that bloody course in which he persevered for the remainder of his life. There is little doubt that Pole would have shared the same fate which befel More and Fisher, had he not withdrawn himself from England and the reach of the king. As it was, his elder brother was put to death, and his mother, the old Countess of Salisbury, was executed, both on the poorest and weakest pretences.

During the remainder of the reign, and through the whole reign of Edward VI., Pole lived abroad. In proportion as he was hated by the king, he was cherished by the pope, by whom he was made a cardinal, employed on several important embassies, and was in fact a principal adviser touching all matters which effected the spiritual affairs of the realm of England, and touching the Reformation generally. On the death of pope Paul III. in 1549, he narrowly missed being elected to the popedom. Failing in this, he retired to a convent near Verona, where he continued till the accession of Mary to the English throne, when an attempt was made to re-unite the English nation to the great body of the Western church.

He reappeared in his native country at the very beginning of the reign, coming as legate from the Roman see, with full power to absolve the nation, and receive it again into the bosom of the Catholic church. Parliament supplicated the queen that this re-union might take place, and the re-union was effected. Then began the cruel measures for the extirpation of heresy and heretics, which have made the reign of Mary so infamous in the English annals. How far Cardinal Pole was implicated in the guilt of those needless and unjustifiable severities, is one of the points in his life on which different opinions will be entertained by those who study with attention the history of that period. It is certain that he had great influence in the councils of that reign, and that he accepted the archbishopric of Canterbury when Cranmer was put to death. At the same time, the apparent rectitude of his conduct and the general mildness of his disposition seem to forbid us to suppose that he could be any party to the dreadful severities of that period.

Besides the high dignity of primate, he was made chancellor of both the universities, which he visited by his commissioners. If any man could have done it, he would have effected the entire reversal of the measures of the Reformation in England, had the life of the queen been prolonged: but her reign was short; she died in 1558, and, by a singular coincidence, Pole himself died about sixteen hours after her.

Those who wish to enter at large into the history of this distinguished person, and to see what may be said on both sides, in respect to his character and conduct in those ambiguous times, may consult his Life, written by Mr. Philips, and the Review of the Life, by Dr. Gloster Ridley. His portrait by Raffaelle, well known by the engravings of it, gives a very lively idea of his personal appearance.

POLECAT. [Weasels.]

POLEMARCH. [Archon.]

PO'LEMO (Πολέμων), the name of several Greek writers, of whom the most important are:—

1. Polemo, the philosopher, the son of Philostratus, who succeeded Xenocrates as the head of the Old Academy about B.C. 315. (Diog. Laert., iv. 16.) He died in B.C. 270, and was succeeded by Crates. (Clinton's *Fast. Hell.*, vol. ii., p. 367.)

Polemo wrote several works (Diog. Laert., iv. 20), which are referred to by Cicero (*Acad. Quæst.*, ii. 42), but none of them have come down to us. Cicero says that Polemo did not differ much from Aristotle. (*De Orat.*, iii. 18.) Zeno and Arcesilas were his disciples. (Cic., *Acad. Quæst.*, i. 9.)

2. Polemo, the sophist, who was born at Laodicea, and was one of the most celebrated teachers of rhetoric in the beginning of the second century of the Christian æra. He

was highly esteemed by Hadrian and Antoninus Pius. He taught at Smyrna, and conferred great benefits upon the town. He died in his fifty-sixth year, and is said to have been buried alive at his own request, because he was unable to endure the pain which he suffered from attacks of the gout.

The Life of Polemo has been written by Philostratus, who mentions several of his works. These however are all lost, with the exception of two funeral orations (ἐπιτάφιοι λόγοι), supposed to have been spoken in honour of Cynægirus and Callimachus, who fell in the battle of Marathon. These orations were first published by Stephanus, 1567, and afterwards by Poussines, 1637, Toulouse. The most recent and the best edition is by Orellius, Leipzig, 1819, 8vo.

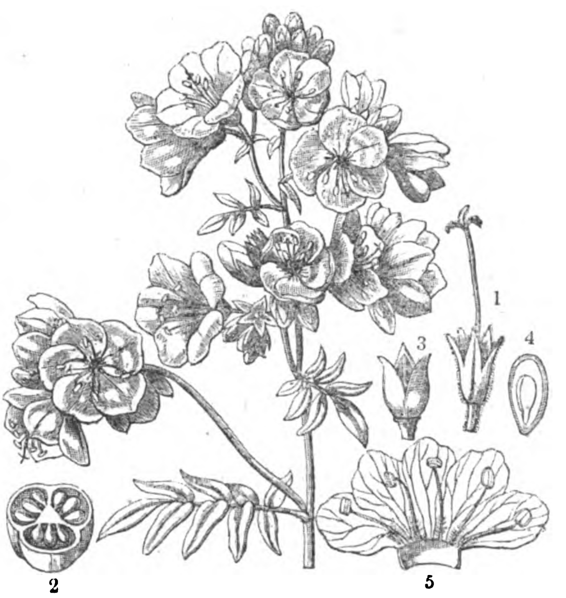
(Fabricii *Bibliotheca Græca*, ed. Harles, vol. vi., p. 2; Philostratus, *Life of Polemo.*)

3. POLEMO, surnamed PERIEGETES (ὁ περιηγητής, Strabo, ix., p. 396), was a native of Samos or Sicyon (Athen., vi., p. 234, d), and was made a citizen of Athens. (Suidas, *Polemo.*) He lived about B.C. 200. A list of his works, which amount to twenty-six in number, and are principally on geographical and historical subjects, is given by Clinton, in the third volume of his 'Fasti Hellenici,' p. 514. None of these have come down to us entire, but the fragments which are extant have been published under the following title:—'Polemonis Periegetæ Fragmenta collegit, digessit, Notis auxit L. Preller. Acc. de Polemonis Vita et Scriptis et de Historia atque arte Periegetarum Commentationes,' Lips., 1838, 8vo.

PO'LEMO (Πολέμων), the author of a work on physiognomy which is still extant, of whose life no particulars are known. According to some writers, he was an Athenian, but Sylburgius (in *Præfat. ad Aristot.*, vol. vi.) and Fabricius (*Bibl. Gr.*, vol. ii., p. 170) consider his style to be too incorrect for a native of that city. From some expressions used by Polemo (for instance, the word εἰδωλόθυτος, lib. i., cap. 6, p. 197), it seems probable that he was a Christian. As to his date, it is only known that he must have lived before the time of Origen, who quotes him (*Cont. Cels.*, lib. i., p. 26). His work (which appears to have suffered much from the ignorance of transcribers) is divided into two books. In the first, which contains twenty-three chapters, after proving the utility of physiognomy, he lays down the general principles of the science; he speaks of the shape of the head, of the colour of the hair, of the forehead, the eyes, the ears, the nose, the manner of breathing, the sound of the voice, &c: in the second book, which consists of twenty-seven chapters, he goes on to apply the principles he had before laid down, and describes in a few words the characters of the courageous man, the timid, the impudent, the passionate, the talkative, &c. The greater part of his observations are very ridiculous, but several of them have been borrowed by J. B. Porta and other more recent writers on the subject of physiognomy. His work was first published by Camillus Peruscus, with Ælian's 'Varia Historia' and other works, Græce, Romæ, 1545, 4to. A Latin translation by Nicolas Petreius was published with Meletius 'De Naturâ Hominis' and other works, Venet., 1552, 4to. There is also an edition of the Greek text by Franc. Montecucli, Mutin., 1611, 4to.; and it is inserted by Sylburgius in the sixth vol. of his edition of Aristotle's works, Francof., 1587, 4to. The best edition is that by J. F. Franzius, who has inserted it in his 'Scriptores Physiognomiæ Veteres,' Altenb., 1780, 8vo., Gr. and Lat., and has added a learned preface and notes.

PO'LEMO. [PONTUS.]

POLEMONIA'CEÆ, a natural order of monopetalous Exogens, with a trifid stigma, three-celled fruit, and seeds attached to an axile placenta, the embryo lying in the midst of albumen. They are allied to Convolvulaceæ, from which their calyx, æstivation, placentation, seeds, and three-celled fruit distinguish them; and also to the Echial alliance, from which their placentation, undivided capsular, not nucamentaceous fruit, and straight inflorescence, equally disjoin them. They consist for the most part of gay-flowered herbaceous plants, natives chiefly of North America. The genera *Collomia*, *Phlox*, *Leptosiphon*, *Gilia*, and *Polemonium* are common objects of cultivation, on account of their beauty; as also is *Cobæa*, a climbing plant which grows with great rapidity, and is much used during the summer for covering trellis-work and places which require to be decorated with foliage for a few months. None of the order are of either economical or medicinal value



Polemonium cæruleum.

1, a calyx, style, and stigma; 2, a transverse section of the ovary; 3, a capsule; 4, a perpendicular section of a seed, showing the embryo; 5, a corolla laid open.

POLI, JOSEPH XAVIER, was born at Molfetta in the kingdom of Naples, in 1746. He was educated at the university of Padua, under the celebrated Facciolati: he was also the pupil and friend of Morgagni, and fellow-student with Scarpa, with whom he studied anatomy and medicine. On the termination of his education he entered the army, and his scientific and literary acquirements becoming known to Ferdinand I., he appointed him, in 1776, professor of military geography at Naples. The king also sent him into France, Germany, England, and Holland, to visit the different foreign military academies. During his travels he became acquainted with many eminent scientific men in the countries which he passed through. In England he met with Herschel, Banks, and John Hunter, and he acquired much information from Hunter on comparative anatomy and on the mode of preparing specimens in natural history. While in London he was elected a member of the Royal Society. On his return home he was appointed professor of experimental philosophy at Naples, and he afterwards undertook the office of tutor to the hereditary prince, and became director of the military academy at Naples. He always highly enjoyed the confidence and favour of the royal family, and he accompanied them to Sicily during the French revolutionary war. He died at Naples in 1825.

Though he successfully cultivated other branches of science and literature, Poli owes his celebrity to his researches in comparative anatomy and natural history: his attention was particularly directed to the study of the testaceous mollusca. While travelling in Italy and abroad, he formed a very fine collection of shells, which was purchased of him by the Neapolitan government. He determined however to be something more than a simple conchologist, and diligently investigated the structure and habits of the animals that inhabit the shells, which had hitherto almost escaped attention. The results of his labours were published in a splendid work denominated 'Testacea utriusque Siciliæ eorumque Historia et Anatome,' folio, Parma. Two volumes appeared in 1792-5, illustrated with thirty-nine beautiful plates engraved on steel. These contain the multivalved and bivalved testacea, and cost the author twelve years of research. The third volume, embracing the univalves, was delayed by the political troubles with which the country was agitated; and though nearly completed, was not published until 1826, after the death of the author: it contains eighteen plates, making fifty-seven in all. This sumptuous work is as remarkable for the value of the text as the beauty of the plates. The structure, habits, locality, and mode of capture of the different molluscs inhabiting the southern coasts of Italy are accurately described; as well as the form, colour, and other peculiarities of the shells in which they are contained. Poli discovered many new and interesting anatomical and physiological facts, as well as new genera and species; and his descriptions are mostly very accurate. He fell however into some errors, the principal of which was that of mistaking the nerves of these animals for lymphatics. This mistake arose from the circumstance of the former organs in the mollusca being surrounded by a loose cellular sheath, which may be easily injected with quicksilver. The first discovery of the nervous system of the testacea is due however to Poli, though he mistook its nature.

He also wrote several works on geography, and some Italian poems.

POLICASTRO. [SALERNO, Province.]

POLICE is that department of government which has for its object to secure the safety, peace, and convenience of the community. Its primary object then is the prevention of crime and the pursuit of offenders; but besides this the police system is subservient to other purposes, such as the suppression of mendicancy, the preservation of order in great thoroughfares, the removal of obstructions and nuisances, and the enforcing of those local and general laws which relate to the public health and comfort.

In the Anglo-Saxon times the whole community was called upon to aid in protecting life and property; and the spirit of this system, though the system is no longer applicable to the existing state of society, still characterises this department of our institutions. The object of the present notice will be to give some account of the former and present constitution of the police in England.

In the Anglo-Saxon period the sheriff of each county, chosen by the freeholders in the folkmote, was the chief officer who was responsible for the conservation of the peace; and in his half-yearly visitations to each hundred in the county, he inquired whether there was any relaxation in the efficiency of the means for effecting this object. The hundred originally consisted of ten divisions, each containing ten freeholders, mutually pledged to repress delinquencies within their district. All males above the age of twelve were obliged to appear at the sheriff's visitation, to state the district to which they belonged, and to be sworn to keep the peace. One out of every ten freeholders had precedency of his companions, and the whole were bound to bring delinquents to justice within thirty days on pain of being themselves liable to penalties. The population was thinly scattered; every man was known to his neighbours; and no man could depart from his dwelling without the consent of his fellow-pledges; and the consent of the sheriff was necessary to enable a man legally to go out of his own county. No man could enter a neighbourhood without being recognised as a stranger, and probably exciting suspicion; and this suspicion, quickened by the responsibility of the freeholders, soon caused a hue and cry if the stranger could give no good account of himself. [HUE AND CRY.]

After the Conquest, the advantages of the system were recognised by several of the Norman kings, particularly by William I., and by Henry I. in the early part of his reign. The former ordered that every freeman should be under pledges, and the latter that views of frank-pledge should be taken in order that none might escape responsibility. But a great innovation was made in the Anglo-Saxon system, when the sheriff, instead of being elected by the freeholders, was appointed directly by the king. He would doubtless be generally a Norman, and therefore indisposed to meet the people in their popular courts: at all events the sheriff's 'tourn,' or half-yearly visitation, came in no long time to be neglected.

When Henry I. instituted the office of justices-itinerant [CONSERVATORS OF THE PEACE], the functions of the sheriff became of still less importance. By the stat. Merton, c. 10, passed 20th Henry III. (1236), freemen who owed suit to the county or hundred court were allowed to appear by attorney. The stat. Marl., c. 10, c. 24, passed in the 52 Henry III. (1268), dispensed with the attendance of the baronage and clergy at the sheriff's court unless their attendance was specially required; and it also prohibited the justices-itinerant from amercing townships on account of persons above the age of twelve years not having been sworn in pledges for keeping the peace. By these various measures the antient system was greatly impaired; and the new laws which were introduced from time to time for the purpose of repressing crime do not seem to have been very successful. In 1277, nine years after the passing of the statute of Marlborough, the absence of 'quick and fresh pursuit' of felons is noticed as an evil which was increasing. To supply the energy and alacrity of the old system, fines and penalties were imposed by the stat. Westminster, prim. 3 Edward I., sec. 9, on all who neglected to pursue offenders. The statute directs that 'all generally be ready and apparelled at the commandment and summons of the sheriffs, and at the cry of the county to pursue and arrest any felons when any need is.' The statute of Winchester, 13 Edward I. (1285), endeavoured to maintain the spirit of the Anglo-Saxon laws by making the county or hundred responsible in case of a delinquent not being forthcoming, and the duty of apprehending him was cast upon all the king's subjects. This statute also regulated the office of constable, an officer who had succeeded the Anglo-Saxon hundred or tything man. [CONSTABLE.] The constables were directed what measures they were to take for preventing crime and keeping the peace. In every town, village, and tything they were to set a watch according to the size of the place, every night from Ascension till Michaelmas, from sunset to sunrise; and the watchmen were to apprehend and examine all strangers, and on their refusal to obey the summons of the watchmen, they might levy hue and cry to take them. The gates of all walled towns were to be shut from sunset to sunrise: the highways were to be kept clear of bushes, woods, or dykes for the space of two hundred feet from hedge to hedge, so that felons might not conceal themselves. Every man was to have arms in his house for preserving the peace; and the constables were empowered to take the view of such arms. The prevention of crime, as well as the pursuit of criminals, was also one of the primary duties of constables, and they were charged to make presentment at the assizes, sessions of the peace or leet, of all blood-sheddings, affrays, outcries, rescues, and other offences against the peace. The justices to whom these presentments were made in the first instance, reported directly to the justices-itinerant, or at once to the king or his privy-council; and the supreme executive made provisions accordingly. At the same time the responsibility cast upon the hundred quickened the vigilance of the inhabitants; and this responsibility extended to individuals in many cases. The following extracts from the Year-Books of the Exchequer are instances of this: '16 Edward I., Sussex: murder and robbery—township of Tyndon amerced, because it happened by day, and they did not take the offender.' '6 Edward II., Kent: manslaughter (upon a sudden quarrel) committed in the highway of Wrotham—three bystanders amerced because they were present when the aforesaid Robert killed the aforesaid John, and did not take him.' And in the reign of Elizabeth the popular vigilance which this system had created leads a writer of that day to remark that 'every Englishman is a serjeant to take the thief, and who showeth negligence therein do not only incur evil opinion therefore, but hardly shall escape punishment.' Thus the Anglo-Saxon system of mutual protection having fallen to decay, the spirit of vigilance which characterised it was in some measure replaced by the greater energy and activity of the supreme executive. In process of time great social and political, and, it may be added, physical changes have rendered both systems equally incapable of effecting the objects for which they were intended.

Instead of being almost entirely engaged in agriculture, the population is now occupied in an extraordinary diversity of employments and pursuits, many of them occasioning and requiring a high degree of intellectual cultivation. Persons so engaged, and the more numerous class who live by manual labour, cannot now follow up the 'quick and fresh pursuit' of felons, at the cry of the hundred or county, from the incompatibility of such a duty with their ordinary pursuits and their daily labour. By a rural population, consisting in a greater proportion of persons having property at stake, and armed for the purpose, the call of the sheriff would be attended to with alacrity, and the excitement of the pursuit would probably be far from disagreeable. But now such a pursuit would be quite ineffectual: an offender may have committed a robbery in Lancashire in the evening, and be concealed in the metropolis by the next morning. As a consequence of these various changes, it has not been possible to render the hundred responsible for the delinquences committed within its limits, and the inhabitants being now, except in a few cases (7 & 8 Geo IV., c. 31), free from such responsibility, they are naturally careless respecting either the prevention of crime or the apprehension of criminals. And while the disposition of the community to aid the public force in these duties was gradually diminishing, the duties of the constable became much more complicated, and required the whole of the time of those who fulfilled them. The same necessity which had rendered a standing army, instead of a militia, a more useful division of employment, had become equally urgent in the case of those on whom devolved the duty of keeping the peace and watching over the security of the community. Instead however of the constabulary force being re-organised, and adapted to a new state of society, it was suffered to remain, with weaker powers, to cope with circumstances which demanded increased vigilance, activity, and intelligence. The office of constable, which, to be competently fulfilled, required a complete devotion to the purposes for which it was instituted, remained still a yearly appointment, and one so obnoxious, that persons were thrust into it who were incapable of executing the duties. Under the most favourable circumstances, the loss of time and the scanty remuneration offered no inducement to exertion; and if the duties were performed with something like energy, by the farmer or small tradesman during his year of office, they were performed at the risk perhaps of injuring their private interests. A power so constituted cannot effectually prevent crime; and it is equally inefficient for the purposes of inquiry and presentment. The parish constable usually acts only when called upon by some private party, and the services of the constabulary force are only combined occasionally, when any evil has become so extensive as to excite loud complaint, and then the absence of general regulations and rules of discipline renders their services of comparatively little value. In the manufacturing districts, when any disturbance is apprehended, such a force is useless, and the practice is either to swear in a large number of special constables, or to call in the aid of the military power. The former proceeding is found to be very inefficacious, as the special constables are deficient in the necessary degree of discipline, and they are as timid in the performance of their duties as they are unwilling to undertake them. The appearance of controlling a district by military force is an evil which, under present circumstances, cannot be avoided in many cases. The want of confidence in the old police force is also attested by the existence of upwards of five hundred voluntary associations for the apprehension and prosecution of felons: their funds are expended in the prosecution of criminals, rather than in the prevention of crime. Some of these associations have rules which bind the members, as in the case of horse-stealing, to take horse, and join in the pursuit of the thief. Railway Acts bind the companies to maintain a police during the formation of the line. An act was passed in August, 1840 (3 and 4 Vict., c. 50), entitled 'An Act to provide for keeping the peace on canals and navigable rivers.' Private watchmen are also extensively employed in docks and warehouses.

To correct the various evils incident to the constitution of the present rural constabulary, the magistrates of Cheshire, in 1829, made the first provincial attempt to improve the administration of police in their county, and they obtained an Act (10 Geo. IV., c. 97) which authorised them to appoint and direct a paid constabulary. A more successful attempt was made at Barnet by a voluntary association, which at first engaged two officers only to patrol a limited district. The plan was found so advantageous, that it was adopted in a more extensive circle. These isolated examples however render the adjacent unprotected districts in a worse state than they were before. The establishment of a new police force for the metropolis, in 1829, has done more towards exhibiting the advantages of employing a trained body of men for all the purposes for which the old constabulary was appointed, than any other circumstance. Viewed at first with suspicion and dislike, from its somewhat military organization, the clamour with which it was assailed has died away, and public opinion is now steadily in its favour. Each parish had formerly managed its own police affairs; and before 1829, the total police force of the metropolis consisted of 797 parochial day officers, 2785 night watch, and upwards of 100 private watchmen: including the Bow-street day and night patrol, there were about 4000 men employed in the district stretching from Brentford-bridge on the west to the river Lea on the east, and from Highgate on the north to Streatham on the south, the city of London being excluded. The management of this large force was of varied and often of conflicting character. The act of parliament creating the new police force (10 Geo. IV., c. 44) placed the control of the whole body in the hands of two commissioners, who devote their whole time to their duties: they are immediately responsible to the home secretary of state. By the 2 & 3 Victoria, c. 47, the metropolitan police district may be extended to any parish or part of a parish situated within 15 miles of Charing Cross, the first act having limited its operation to a distance of twelve miles. The number of men of each rank serving in the metropolitan police force, in January, 1840, was as follows:—

		Salary.	
1	Inspecting Superintendent .	£400	0
1	Superintendent . .	300	0
16	ditto . . .	250	0
73	Inspectors . .	118	6
349	Sergeants . .	63	14
250	Constables, 1st class . .	54	12
2,527	ditto 2nd „ . .	49	8
269	ditto 3rd „ . .	44	4

The sergeants and constables are allowed clothing, and each married man of these two ranks is allowed 40 pounds weight of coals weekly throughout the year; each single man is allowed 40 pounds weight weekly during six winter months, and 20 pounds weight weekly for the remainder of the year.

The total number of the force is 3486, who are placed in divisions, each division being employed in a distinct district. Every part of the metropolis is divided into 'beats,' and is watched day and night. The total disbursement on account of the force, for the year 1839, amounted to 221,993*l.*, one-fourth of which is paid by the treasury out of the public revenue, and the other three-fourths by the respective parishes. Since August, 1839, the horse patrol, consisting of 71 mounted men, who are employed within a distance of several miles around London, has been incorporated with the metropolitan police. The Thames police consists of 21 surveyors, each of whom has charge of three men and a boat when on duty. The establishment is under the immediate direction of the magistrates of the Thames Police-office. The city of London still manages its own police affairs, which have been placed under a far more efficient system since the establishment of the metropolitan police force. In 1833 the number of persons employed in the several wards of the city was—ordinary watchmen, 500; superintending watchmen, 65; patrolling watchmen, 91; beadles, 54—total, 710. The number of men on duty in the city at midnight is about 400. The expense of the day police, consisting of about 120 men, amounts to about 9000*l.* a-year, and is defrayed by the corporation; and the sums levied on the wards for the support of the night-watch average about 42,000*l.* per annum. In addition to the paid watchmen, about 400 ward constables are appointed.

The police of the metropolis and the district within fifteen miles of Charing Cross (exclusive of the city of London) is regulated by the Acts 10 Geo. IV., c. 44, and 2 and 3 Vict., c. 47, and together they form the police code for nearly a seventh part of the population of England and Wales.

The officers and men of the metropolitan police have been at various times engaged in 200 places to protect the peace when the local force has been found incompetent. In nearly all the boroughs constituted under the Municipal Reform Act (5 & 6 Will. IV., c. 76) a paid police force has been established as nearly as possible on the same footing as the metropolitan police. In the metropolis, 'when any burglary or serious offence is brought to the knowledge of the police, the superintendent or other officer of the division or subdivision where the offence has occurred immediately examines the circumstances, or makes a precognition and a report upon them and the measures taken in consequence. . . . . A daily report or presentment is made to the commissioners of all the chief occurrences which have taken place during the preceding twenty-four hours in every division of nearly two counties, upon which presentment such instructions are given as any special circumstances may seem to require. Upon other reports, made at such intervals as to comprehend general results, if it shall appear that in any district there has been an influx of depredators, additional strength is directed upon it, or explanations are required if any marked evil appear to continue without abatement.' The state of things under the former 'disjointed and conflicting system is thus described in the Report of a Select Committee of the House of Commons in 1834:—'The police was roused into earnest action only as some flagrant violation of the public peace or some deep injury to private individuals impelled it into exertion; and security to persons and property was sought to be obtained, not by the activity and wholesome vigour of a preventive police, which it is the paramount duty of a state to provide, but by resorting from time to time, as an occasional increase of the more violent breaches of the law demanded it, to the highest and ultimate penalties, in the hope of checking the more desperate offenders.' Not only is the metropolitan police active night and day in preventing depredations and suppressing mendicancy, but its attention is directed to giving assistance in case of accidents, reporting nuisances and obstructions, and in keeping a vigilant eye upon the recesses of profligacy and crime. The same services are performed with more or less efficiency in the large towns which have the services of a trained body of men.

The difficulty of re-organising the rural constabulary has hitherto retarded the general improvement of this force, while the increased vigilance of the towns has rendered such a measure more imperative. In October, 1837, a commission was appointed under the crown 'to inquire into the best means of establishing an efficient constabulary force in the counties of England and Wales;' and the commissioners having taken means to ascertain the opinions of the magistracy in each petty-sessional division in the country, it was found that, out of 435 divisions, the magistrates in 123 of them recommended the appointment of a paid rural police; in 13 divisions they recommended such a force, with a proviso that it be placed under their exclusive control; in 77 divisions the appointment of a patrol or of additional constables was recommended; in 16, the better remuneration of the present constables; in 37 divisions it was considered that further security was necessary; and in 122 divisions an opinion was given that no alteration was required. The local magistracy are in many instances jealous of the interference of the supreme executive; yet, notwithstanding, the balance of opinion is in favour of an alteration. The evils of the present inefficient system are fully described in the Report of the Constabulary Commissioners (No. 169, Session 1839). Some of their recommendations involve questions of provincial organization, which render it very difficult to bring a uniform system of police administration into general operation. In a bill introduced into the House of Commons in 1839, an attempt was made to remove some of these obstacles, and a very clear and detailed account of the plan was printed with the bill (No. 71, Session 1839); but the measure was regarded as too elaborate, and introduced so many innovations as to occasion its ultimate rejection.

The following is a brief summary of the principal reasons which induced the Constabulary Commissioners to recommend the appointment of a paid police force in lieu of the present parish constables:—The want of organization in any existing force has encouraged crime, and each person living by depredations costs much more to the community than a paid constable. Besides the expenses of judicial establishments, a sum exceeding 2,000,000*l.* is paid annually in England for the repression of crime, while the means for the attainment of this object are imperfect and inefficient. Even the money at present contributed by voluntary associations for self-protection would, it is thought, go far towards obtaining an effective combined force; and there would be also the saving of time to several thousand persons now annually forced into almost useless service as constables, or a saving of money which is paid for substitutes. The extent of the force required is estimated at rather more than 8000 men, and the annual cost at a sum below 450,000*l.*, including expenses of management and other charges, the whole not exceeding 1¼*d.* in the pound on the valuation of real property in England and Wales in 1815; and it is proposed that one-fourth of the annual cost be defrayed out of the consolidated fund, and the other three-fourths out of the county rate. The average number of commitments in England is upwards of 100,000 annually, which number, it is assumed, represents a total of 40,000 persons living wholly by depredation, to which must be added those who live partially by such means and escape detection, to meet which active body a trained force of 8000 men appears to be a moderate estimate. The commissioners recommended that a disposable force of 300 or 400 additional men be kept for extraordinary services. The patronage connected with a paid constabulary should be vested in those who are directly responsible for its efficiency; and local supervision and control might be made consistent with this arrangement. The success of such a force would of course depend to a great extent upon its being seconded by popular feeling, and, contrary to the opinion of many persons, it would be less likely to infringe upon personal liberty than a body of isolated individuals, as an acquaintance with legal duties forms part of the training of a combined force, which must in all cases have general rules for its conduct and government. Should a trained constabulary be established, the commissioners recommended that the men be changed from one district to another in the same manner as the officers of the Excise establishment.

The government has not thought proper to take any steps for the general establishment of a trained constabulary force in England and Wales; but in 1839 an act was passed (2 and 3 Victoria, c. 93) enabling the magistrates to appoint county and district constables, thus leaving the improvement of the police to their discretion. The act empowers the magistrates assembled in quarter-sessions to report to the secretary of state the necessity of appointing additional constables, but not in a greater proportion than one constable to each one thousand of the population; the expenses to be charged upon the county-rate in the several divisions in which the force has been appointed. To secure unity of action and general uniformity, the secretary of state is to frame rules for the regulation of the new force. The men employed in it are not to exercise any other employment, and are not allowed to vote at elections for a member of parliament. The provisions of this act have been adopted by the following counties or districts of counties:—Bedfordshire, Bucks, Cumberland, Durham, Essex, Gloucester, Hants, Lancashire, Leicestershire, Norfolk, Northamptonshire, Notts, Salop, Stafford, Suffolk, Warwick, Wilts, Worcester, and Glamorganshire. A Parliamentary Return (No. 363, Sess. 1840) shows the estimated expenses of the new constabulary force in each of the above counties, and the additional rate in the pound which it will be necessary to levy for its maintenance.

In August, 1840, an act received the royal assent (3 and 4 Victoria, c. 88) amending the act of the previous session for facilitating the establishment of a paid constabulary. It removed the restriction in the previous act which limited the appointment of constables to a proportion not exceeding one to each one thousand of the inhabitants; and made provisions for the consolidation of the borough and county police in cases where the respective authorities desire to enter into such an arrangement.

In addition to the two acts above mentioned, the following statutes enable magistrates to obtain any additional police force which may be requisite to ensure the conservation of the peace:—1, The 3 and 4 Wm. IV., c. 90, entitled 'An Act to repeal an Act of the 11th year of his late Majesty King George IV., for the lighting and watching of parishes in England and Wales, and to make other provisions in lieu thereof, by which the rate-payers can tax themselves for the purpose of watching.' This act is intended to supersede the necessity of each parish incurring the expense of obtaining a separate local act. 2, The Act 1 and 2 William IV., c. 41 (amended by the 5 and 6 Wm. IV., c. 43), relates to the appointment of special constables, and the title sufficiently explains its object:—'An Act for amending the laws relative to the appointment of special constables, and for the better preservation of the peace.' Under this statute special constables may be sworn in on apprehension of a breach of the peace, and they may be paid out of the county rate. The act also enables the magistrates to obtain the services of the metropolitan police, and provides in like manner for their payment.

POLICY and POLITY. Policy is generally used to signify the line of conduct which the rulers of a nation adopt on particular questions, especially with regard to foreign countries, and according to our opinion of that particular line of conduct we say that it is good or bad policy. Polity has a more extended sense, being synonymous with the principles of government, and this is the sense of the Greek 'politeia' (*πολιτεία*), from which it is derived. Police, in an extended sense, is that branch of polity which is concerned with the internal economy of the state. In a more restricted sense it is a branch of preventive administration, distinct from the administration of justice, the object of which, among other things, is the punishment of crimes committed.

POLICY. [Insurance.]

POLIDO'RO DA CARAVA'GGIO. [Caravaggio.]

POLIGNAC, MELCHIOR, CARDINAL DE, born at Puy in Languedoc, in 1661, of an illustrious family studied at Paris, and took holy orders. He accompanied Cardinal de Bouillon to Rome in 1689, and was employed as a negotiator to settle some differences between France and the court of Rome. In 1693, the Abbé de Polignac was sent by Louis XIV. as ambassador to Poland, where, after the death of John Sobieski, in 1696, he contrived to have François Louis de Bourbon, prince of Conti, proclaimed king of Poland by the majority of the electors. But another party proclaimed Frederic Augustus, elector of Saxony, who was at length acknowledged by the whole nation. [AUGUSTUS II.] Louis XIV., being displeased, recalled the Abbé de Polignac, and banished him to his abbacy at Bonport, where he employed himself in writing his poem in refutation of Lucretius. Being recalled to court after some years, he was appointed by Louis XIV., in 1706, auditor of the rota at Rome, a court which is concerned about questions of ecclesiastical benefices and other clerical temporalities throughout the Catholic world. In 1709 he returned to France, and in 1710 he was sent to Holland to negotiate the general peace. He was one of the French plenipotentiaries at the congress of Utrecht. In 1713 he was named cardinal. In 1724 he went to Rome as minister of France. In 1732 he returned, and he died in 1741, at a very advanced age. Cardinal Polignac was a member of the French Academy, of the Academy of Sciences, and of that of Inscriptions and Belles Lettres. (*Eloge du Cardinal de Polignac*, Paris, 1742.)

His Latin poem, 'Anti-Lucretius, sive de Deo et Natura libri novem,' Paris, 1754, is a refutation of the system of Lucretius, and intended as a demonstration, from evidence afforded by the works of the creation, of the existence of a Supreme Being, the maker and regulator of all things. Some of the descriptions are very fine; the style resembles that of Virgil. The ninth book was left unfinished by the author, and the whole poem was not published till after his death. The 'Anti-Lucretius' has been translated into French and Italian.

POLIGNY. [JURA, Department.]

POLINICES, De Montfort's genuine name for *Natica Mammilla* (*Nerita Mammilla*, Linn.), his *Polinices albus*, and other similar forms.

POLITICAL ECONOMY is the name given to a department of knowledge the limits of which are not yet accurately defined. The word economy, applied to domestic concerns, means the art of well administering the private affairs of a family, of regulating its expenditure according to its income, and providing for the wants of the members of the household. By analogy, political or 'public' economy has been considered by many as conversant about the principles of administering the wealth of a country with a view to its increase, regulating the expenditure, providing for the wants of the people, and endeavouring to maintain and increase their comforts. But by taking such an extensive view of the subject, most writers, and especially continental writers, have considered it necessary to investigate all the causes of the prosperity of nations, and have involved themselves in multifarious discussions on the various forms of government and of civil institutions which are supposed to affect the economical condition of a people. By so doing they have encroached upon the science of general politics and legislation, and have brought forward their own theories of laws, ethics, and administration, with the view of showing their influence on the social state. But it is evident that such a vast field of inquiry must exceed the powers of any single writer, and that the attempt to embrace so many difficult and varied subjects under one division of knowledge, tends to confuse rather than to elucidate. Modern writers, especially in England, have therefore limited their inquiries to the principles which govern the production and accumulation of wealth, and its distribution and consumption. 'The Wealth of Nations' was the title which Adam Smith gave to his work. In this consists the main difference between the modern English and the Italian and French economists. The latter maintain that the political economist is concerned not only with the aggregate production of wealth, but with its most beneficial distribution among individuals, not only with wealth in short, but with happiness also. The modern English writers, on the contrary, say that the appropriate subject of the political economist is not happiness, but wealth; that wealth is confined to material objects, the produce of land and of industry; that the political economist who assumes to explain the phenomena of the production of wealth ought to lay down the general principles on which wealth is produced, as they are deducible from actual facts; it is the business of the statesman, the philosopher, or the politician, to say what he thinks best for the general prosperity of society, after he has examined the evidence of the political economist, which is an essential part of the evidence, but not the sole evidence to be attended to in the conduct of a nation's affairs. But here the English economists also seem to be divided among themselves. Some appear to think that the principles of political economy, as the term is understood by them, may be deduced with the certainty of mathematical demonstration, whilst others assert that there are many important propositions in political economy which require limitations and exceptions. 'The desire to simplify and generalise has occasioned an unwillingness to acknowledge the operation of more causes than one in the production of particular effects; and if one cause would account for a considerable portion of a certain class of phenomena, the whole has been ascribed to it without sufficient attention to the facts which would not admit of being so solved.' (Malthus, *Principles of Political Economy*, 'Introduction.') Malthus quotes the controversy on the bullion question as an instance of this kind of error. He afterwards goes on to say, 'Adam Smith has stated that capitals are increased by parsimony, that every frugal man is a public benefactor (*Wealth of Nations*, b. ii., ch. 3), and that the increase of wealth depends upon the balance of produce above consumption (b. iv., ch. 3). That these propositions are true to a great extent is perfectly unquestionable. No considerable and continued increase of wealth could possibly take place without that degree of frugality which occasions annually the conversion of some revenue into capital, and creates a balance of produce above consumption; but it is quite obvious that they are not true to an indefinite extent, and that the principle of saving, pushed to excess, would destroy the motive to production. If every person was satisfied with the simplest food, the poorest clothing, and the meanest houses, it is certain that no other sort of food, clothing, and lodging would be in existence; and as there would be no adequate motive to the proprietors of land to cultivate well, not only the wealth derived from conveniences and luxuries would be quite at an end, but, if the same division of land continued, the production of food would be prematurely checked, and population would come to a stand long before the soil had been well cultivated. If consumption exceed production, the capital of the country must be diminished, and its wealth must be gradually destroyed, from its want of power to produce; if production be in a great excess above consumption, the motive to accumulate and produce must cease from a want of will to consume. The two extremes are obvious; and it follows that there must be some intermediate point, though the resources of political economy may not be able to ascertain it, whereby, taking into consideration both the power to produce and the will to consume, the encouragement to the increase of wealth is the greatest. The division of landed property presents another obvious instance of the same kind. No person has ever for a moment doubted that the division of such immense tracts of land as were formerly in possession of the great feudal proprietors must be favourable to industry and production. It is equally difficult to doubt that a division of landed property may be carried to such an extent as to destroy all the benefits to be derived from the accumulation of capital and the division of labour, and to occasion the most extended poverty. There is here then a point, as well as in the other instance, though we may not know how to place it, where the division of property is best suited to the actual circumstances of the society, and calculated to give the best stimulus to production and to the increase of wealth and population.' (Malthus, *Introduction.*)

We cannot enter into anything like an examination, however brief, of the principles of political economy; but we shall merely state a few general propositions which are universally acknowledged as true. 1. Every man desires to obtain additional wealth with as little trouble to himself as possible. 2. The increase of population is limited either by physical or moral evil, or by prudential motives. 3. The powers of labour, and of the other instruments which produce wealth, may be indefinitely increased, by using their products as the means of further production. 4. Agricultural produce is not susceptible of the same unlimited increase as manufactures. The principal topics discussed by political economists are: 1, the definition of wealth; 2, of productive and unproductive labour; 3, on the nature and measures of value; 4, on the rent of land; 5, the wages of labour; 6, the profits of capital; 7, the results of machinery; 8, the circulating medium, or currency; 9, the nature and conditions of commerce, or exchange of commodities. Most of these subjects are treated in this work under the heads ACCUMULATION, BALANCE OF TRADE, BULLION, CONSUMPTION, CURRENCY, EXCHANGE, PROFIT, RENT, WAGES, WEALTH.

History of the Science.—The great nations of antiquity, the Greeks and Romans, had no notion of what we understand by political economy. They sought to increase their wealth chiefly by war, by conquering and plundering weaker nations, and appropriating to their own use part of the produce of their industry. They considered handicraft and trade as degrading to a citizen, and left those pursuits to be exercised by slaves or freedmen. The Romans, in the earlier ages of the republic, held agriculture in more esteem; but after they had extended their conquests beyond the limits of Latium, the business of agriculture also was mainly conducted by slaves. The consequences of this system are well known; agriculture declined, and the people of Rome were obliged to be fed by corn from the provinces. It is evident that in such a state of society there will be no room for the consideration of some of the most important questions of political economy, which are based upon the principles of free labour and competition. It appears that the Romans considered gold not as the representative of wealth, but as wealth itself, for we find that the senate forbade its exportation. (Cicero, *Pro Flacco*, 28.)

After the fall of the Roman empire, the free towns that rose in the middle ages, Pisa, Venice, Florence, Genoa, and the Hanseatic towns, were essentially commercial, and with them the 'mercantile' system, as it is called, may be said to have originated, at least in practice; for it was not expounded and reduced to rules until centuries after. This system consisted in looking to foreign trade as the source of wealth, selling dear and buying cheap, and thereby realising, by the exchange, a surplus in bullion, which surplus was employed in increasing the quantity of produce to be sold. Shipping, foreign marts, colonies or factories abroad, were the means employed for these objects. But as each mercantile nation sought a monopoly of trade, restrictions were resorted to in order to favour its own commerce and impede or depress that of others. This led to jealousies and wars, which ended with the ruin of one or the other of the contending parties. This system was narrow and exclusive: it considered only one state, and built the prosperity of that state on the depression of others. It was affected by the same error as the military system of conquerors, who wish to exalt and enrich one country by subjugating and plundering another, overlooking the fact that the prosperity of other countries is part of the general prosperity of the world, in which our own country must share. The principle that 'the whole world as to trade is but as one nation or people, and therein nations are as persons' (Sir Dudley North's *Discourses on Trade*, 1661), was not known as yet, and indeed it may be said to be hardly known, or at least acknowledged, even now, except by very few, in any country.

Another mistake of the states of the middle ages was that of considering gold and silver as constituting the exclusive wealth of a country; their attention was fixed on money not as a means, but as the end of trade, and as the most beneficial surplus, which they endeavoured to retain in their coffers by enacting severe penalties against its exportation. Hence the earlier Italian writers on commerce treat exclusively of money, its standard, and the evils of tampering with it. Gasparo Scaruffi, of Reggio near Modena, wrote, in 1579, 'Discorso sopra le Monete, e della vera proporzione frà l'oro e l'argento.' In 1588 Bernardo Davanzati of Florence wrote a short treatise, 'Sulle Monete,' and another 'Sui Cambj,' or 'The Exchanges.' Antonio Serra, a native of Cosenza in Calabria, published, in 1613, 'Breve Trattato delle Cause che possono far abbondare i Regni d'Oro e d'Argento.' Looking upon gold and silver as constituting the wealth of a state, Serra investigates the means of making them flow abundantly into a country. Among these means he reckons manufactures, 'which afford a much greater return than agriculture;' and maritime commerce. But 'these means,' adds Serra, 'are of no avail without fixed laws, order, and security for persons and property, for there can be no prosperity where there are continual changes of dynasties and laws.' This shows that Serra, considering the age and country in which he lived, had formed some correct and extended notions of political economy. His book however remained unnoticed, and the author, being implicated, as it seems, in some conspiracy against the Spanish rulers of Naples, was imprisoned for ten years, and underwent the torture seven times. It is not known when and where he died. Turbolo of Naples wrote several treatises on the coinage and the state of money in the kingdom of Naples: 'Discorsi e Relazione sulle Monete del Regno di Napoli,' 1616, 1618, 1623, and 1629. Geminiano Montanari of Modena published, in 1680, 'Trattato Mercantile delle Monete,' and afterwards, 'Trattato del Valore delle Monete in tutti gli Stati,' in which he lays down sound principles for regulating the coinage.

The first writers on the subject of commerce at large appeared in England. Raleigh wrote, in 1595, his 'Essay on Trade;' Edward Misselden wrote his 'Circle of Trade,' in 1623, and Louis Roberts his 'Treasure of Traffic,' in 1641. Thomas Mun wrote, in 1621, his 'Defence of the East India Trade,' in which he exploded the notion that money exclusively constituted wealth. He compared the exportation of gold and silver wherewith to buy goods for importation, with the seed which the husbandman throws into the earth that he may reap a plentiful harvest; and in his 'Treasure of Foreign Trade,' published in 1664, Mun advocates the same principle. But Sir William Petty went further than any of his predecessors or contemporaries in asserting enlarged views of political economy. In his treatise 'On Taxes and Contributions,' published in 1667, he was the first to state, though in an incidental manner, that 'it was the labour required for the production of commodities which determined their value.' He also wrote his 'Quantulumcunque,' a treatise on money, in which he condemned the laws regulating the rate of interest, and combated the notion that a country may be drained of cash by an unfavourable balance of trade. [PETTY, SIR WILLIAM.]

In France, the minister Colbert, a contemporary of Sir William Petty, was a great promoter of the mercantile system in all its exclusiveness [COLBERT], and the principles of that system continued to prevail in France after his death till the time of Quesnay. Pierre le Pesant, Seigneur de Bois Guibert, published, in 1695, his 'Détail sur la France,' in which he treated both of commerce and money, but the author was banished because some of his propositions reflected upon feudal rights and ecclesiastical privileges. Twelve years later Vauban published his 'Dixme Royale,' in which he proposed a new plan of taxation.

In England, Locke, in his 'Essay on Civil Government' (b. xi., 40-43), argued at length to prove that 'labour is the constituent principle of value.' There is something to the same purpose in Hobbes's 'Leviathan' (ch. 24). But these were incidental remarks, and not professed investigations on the subject of political economy.

In a tract published in 1677, entitled 'England's Great Happiness,' the notion of the balance of trade is examined and its fallacy exposed. [BALANCE OF TRADE.] Sir Dudley North, already quoted, wrote 'Discourses on Trade,' 1691, which contain more clear and comprehensive notions on trade than had yet been published. Among other propositions, he lays it down as a maxim that 'there can be no trade unprofitable to the public; for if any prove so, men soon leave it off, and wherever the traders thrive, the public, of which they are a part, thrive also.' It is worthy of notice, by way of contrast, that Montesquieu in the following century wrote a chapter entitled 'To what Nations Commerce is prejudicial.' (*Esprit des Lois*, b. xx., ch. 21.) In 1696 Davenant wrote on 'the Commerce and Revenue of England.' In the next century Sir Matthew Decker wrote an 'Essay on the Causes of the Decline of Foreign Trade,' 1744.

A change of opinion was in the meantime taking place on the Continent with respect to the so-called 'mercantile system.' François Quesnay, born in 1694, a medical man by profession, and surgeon to Louis XV., being struck by the distressed condition of the French peasantry, endeavoured to draw the attention of the government towards relieving that numerous and ill-used class of people. He proposed the abolition of custom-houses between province and province, the free circulation of corn throughout the kingdom, the suppression of the corvées, and other similar reforms, which were effected after his death by Turgot. Quesnay went further: he assumed as a principle that the earth, or in other words, agriculture, was the only source of wealth, in opposition to Colbert's mercantile system, which fixed that source exclusively in trade. Quesnay allowed that manufactures and merchants were highly useful, but he contended that as they realised no net surplus in the shape of rent, they did not add any greater value to the raw material of the commodities which they manufactured or carried from place to place, than was just equivalent to the value of the capital or stock consumed by them during the time that they were engaged in those operations. He divided society into three classes: 1, a productive class, consisting of farmers and agricultural labourers, who subsist on a portion of the produce of the land, reserved to them as wages of labour and as a reasonable profit on their capital; 2, a proprietary class, namely, those who live on the rent of the land, or the net surplus produce raised by the cultivators, after the necessary expenses have been deducted; 3, an unproductive class, consisting of manufacturers, merchants, servants, and handicraftsmen, 'whose labour, though useful, adds nothing to the national wealth, and who subsist entirely on the wages paid to them by the other two classes.' (Quesnay, *Physiocratie, ou Constitution Naturelle des Gouvernemens*, 1768.) As a corollary to these positions, Quesnay and his disciples concluded that all taxes ought to fall upon the land.

Quesnay is considered as the head of the school called the school of the 'Economistes,' which reckoned amongst its members the Marquis de Mirabeau, father of the celebrated Mirabeau, Mercier de la Rivière, Dupont de Némours, Condorcet, Raynal, Turgot, Necker, and other distinguished men.

Quesnay's principal work on political economy is the 'Physiocratie' already mentioned; but he published other tracts, especially an article 'Sur les Grains,' which was inserted in the 'Encyclopédie,' and in which he advocates the same principles. Though Quesnay considered agriculture as the only source of wealth, he did not advocate any exclusive protection for it, but rather a principle of freedom in all branches of trade. The 'Economistes' originated the 'Cadastre,' which was a survey and valuation of all real property, made by order of the government, for the purpose of assessing the 'contribution foncière,' or property tax, which they considered as the only legitimate tax. And this principle has prevailed in France and other continental countries, where even now the tax on land and houses forms the main source of the public revenue, being from 20 to 30 per cent. on the rent.

In Italy, Antonio Bandini of Siena had asserted the fundamental principle of the 'Economistes,' long before Quesnay, in a work which however was not published till 1775. Bandini wrote his 'Discorso Economico' in 1737, with a view of drawing the attention of the Tuscan government to the desolate condition of that vast tract of country called the Maremma of Siena. Bandini advocated freedom of trade in agricultural produce, and recommended the removal of all restrictions upon importation and exportation; he urged the expediency of giving to the cultivators of the soil an interest in the land, by the grant of long leases; and lastly he recommended the removal of the numerous vexatious taxes, and the substitution of a single tax upon land, not excepting ecclesiastical and other privileged property. A MS. copy of Bandini's book was presented to the grand-duke Francis of Lorraine, who however, being soon after elected emperor of Germany, and having removed to Vienna, could not attend to the affairs of the Maremma. But his son Leopold, on coming to the government of Tuscany, consulted Bandini's work, and put into execution the plan therein proposed. The Maremma of Siena assumed a new life, and its population has nearly trebled in the course of half a century.

Antonio Broggia of Naples, a merchant by profession, wrote a treatise on taxation, 'Sul Tributi,' in which he admits that there are three sources of wealth, agriculture, handicraft or manufactures, and commerce. He does not consider the tax on land as the only legitimate tax, but proposes three sorts of taxation, land-tax, customs, and gabelle or excise. He says that in a great commercial country the customs and excise, or indirect tax, ought to be preferred, but in an agricultural country like Naples the tax on land must be the principal source of revenue. He condemns taxes on capital and persons, licences and patents, horses and agricultural implements, as detrimental to industry, as well as the government monopolies of salt, tobacco, &c. The author, who belonged to the mercantile school, falls into the error of that school, in wishing to sell as much as possible to foreigners, and buy as little as possible from them.

Ferdinando Galiani also, of Naples, ranks among the most distinguished writers on political economy in the last century. While at Paris, he wrote in French a book on the corn-trade, 'Dialogues sur le Commerce des Blés,' in which he took a middle course between those who advocated an unrestricted trade in corn, and those who wished it to be subject to permanent restrictions. Galiani contends that no universal system can be established on that important subject, and that the laws concerning the trade in corn must vary according to the situation of individual states, the nature and cultivation of their respective soils, and also their political institutions and relations to other countries. Galiani also wrote, in Italian, a work on money, 'Della Moneta,' published in 1750, which is reckoned one of the best on this subject. Taking an enlarged view, he investigated the nature of the value of things, which he said was the result of various circumstances, namely, their scarcity, utility, the quantity and quality of the labour required for their production, and also the time. He extends his investigations to the value of men's abilities, which are to be estimated not only according to their rarity, but also according to the time required for their coming to maturity, and the difficulties encountered before they can attain a station favourable to their development. This is a position analagous to that afterwards stated by Adam Smith (b. i., ch. 10), 'that the wages of labour vary with the easiness and cheapness or the difficulty and expense of learning a business.' It requires more time and expense to form a physician, or a statesman, or a divine, than a common labourer, and therefore the latter has less value than the former. Galiani combats the received opinion of his time, that high prices were a sign of distress. He also contended that the precious metals were to be considered as merchandise. Galiani may be considered as a reformer of the old mercantile system. [GALIANI.]

Gian Francesco Pagnini, born at Volterra in 1715, published in 1751 a dissertation 'Sopra il giusto Pregio delle Cose,' or the just value of things, and in 1764 a history of the Commerce of Florence, with a digression on the value of gold and silver, and its proportion to the prices of other things in the 14th and 15th centuries, compared with those in the 18th century. Both works contain sound opinions and interesting facts. Pompeo Neri of Florence wrote, in 1751, 'Osservazioni sopra il Prezzo legale delle Monete,' a work of considerable merit.

Gian Rinaldo Carli, born at Capo d'Istria in 1720, ranks with Galiani as one of the most distinguished Italian political economists. He wrote an elaborate work on coin and currency, and on the mints of Italy: 'Delle Monete e della Istituzione delli Zecche d'Italia,' 3 vols. 4to., 1754-60, in which he completely exhausted the subject. Carli also wrote 'Ragionamento sopra i Bilanci Economici delle Nazioni,' in which he combated the fallacy prevalent in his time about the balance of trade. He also discussed the subject of the corn-trade in a letter addressed to Pompeo Neri, in 1771, 'Sul Libero Commercio dei Grani,' in which he agreed with Galiani in denying the wisdom of a general principle of unrestricted freedom of trade in corn, which he thought ought to be modified according to local circumstances, because he considered the supply of corn as a subject deeply connected with administrative policy, and not a mere commercial question. Carli had a powerful mind, uninfluenced by popular opinions or prevalent systems. Other particulars concerning this distinguished writer are given under CARLI.

Antonio Genovesi, born in 1712, at Castiglione near Salerno, became professor of the new chair 'of commerce and mechanics,' founded at Naples in 1755, by Bartolommeo Intiesi, a wealthy Florentine merchant of that city. Genovesi published his lectures under the title of 'Lezioni di Economia Civile,' in 1768. Genovesi took a middle course between the mercantile system and that of the 'Economistes.' He reckoned three sources of wealth, agriculture, arts, and commerce. He extols agriculture as an ample and perennial spring of public wealth, but he also appreciates commerce and manufactures as the causes of an increase of production. With regard to commerce, he adopts the restrictive system of the mercantile school as to foreign goods, whilst he agrees with the 'Economistes' as to the freedom of trade in corn, and of internal trade in general, as well as with respect to the interest of money. He inculcates the principle that labour constitutes the capital of nations as well as of families. But he did not fall into the vulgar error of considering whole classes of society as unproductive because they are not employed in manual labour, such as men of science, scholars, lawyers, soldiers, magistrates, and others. Genovesi wrote also other treatises on political economy, which he succeeded in rendering popular in his own country.

The other Italian political economists of the eighteenth century are: 1, Francesco Algarotti of Venice, born in 1712, who wrote 'Saggio sul Commercio,' in which he extols commerce as the source of wealth and power, and he quotes the example of England. He also wrote a few short suggestions on the advantages which might be derived from Africa, in a commercial point of view, by the nations of Europe: 'Sulla Preferenza dell' Africa in confronto dell' Asia e dell' America, rapporto all' Industria e dal Commercio degli Europei.' 2, Antonio Zanon of Udine in the Venetian territory, born in 1696, a merchant by profession, wrote letters on agriculture, commerce, and manufactures, which he encouraged also by his exertions. He was a man of a liberal mind and a true philanthropist. 3, Cesare Beccaria of Milan wrote lectures on political economy, in which he expounded, among other things, the advantages of the division of labour, and he investigated the relations of wages and labour, and the nature of productive capitals. With regard to the corn-trade, he agreed with Carli and Galiani in not advising any general system. He considered large masses of property as more advantageous to a country than small subdivisions. In general, Beccaria may be considered as belonging to the school of the 'Economistes.' [BECCARIA, CESARE BONESANA.] 4, Pietro Verri, born at Milan in 1727, the intimate friend of Beccaria, although he differed from him on several points of political economy, wrote 'Memorie sull' Economia Pubblica dello Stato di Milano,' in which he shows the decline of that country during the two centuries of Spanish dominion, and ascribes it to the ignorance of its rulers and the absurdity of the laws. He wrote also 'Riflessioni sulle Leggi Vincolanti, principalmente sul Commercio dei Grani,' in which he advocated the principle of absolute liberty. Lastly, he wrote 'Meditazioni sull' Economia Politica,' which were published in 1771, and have been translated into several languages. It is an elementary but useful book. 5, Ferdinando Paoletti, born in 1717, near Florence, wrote, in 1769, 'Pensieri sopra l'Agricoltura, and, in 1772, 'Veri Mezzi di rendere felici le Societa,' in which he advocated freedom of trade. 6, Gian Battista Vasco, born at Mondovi in Piedmont, in 1733, wrote 'Saggio Politico sulla Moneta,' 1772, in which he treats of various questions of political economy. He afterwards wrote, in French, 'Mémoire sur les Causes de la Mendicité et sur les Moyens de la supprimer,' which he sent to the Academy of Valence in Dauphiné, in 1788. His other works were, 'Sulla Felicita Publica considerata nei Coltivatori di Terre proprie;' and 'L'Usura libera.' 7, Giammaria Ortes, born at Venice in 1713, wrote a work entitled 'Dell' Economia Nazionale' libri sei, 1774, which however remained unknown except to a few friends of the author, until Custodi inserted it in his great collection of the Italian economists. His views were original, and he belonged to none of the schools already established. He lays it down as a fundamental principle that the capital of a nation is always in proportion to the population, and that the only difference is in its distribution. If a portion of the population becomes richer, it can only be by impoverishing the rest. As a consequence of this principle, he asserts that all endeavours to increase industry with a view to increase the national wealth are futile. But he supports also the principle of freedom of trade between nations, because, he says, every nation has its own capital, which cannot be diminished nor increased by exchange. Ortes wrote also 'Riflessioni sulla Popolazione per rapporto all' Economia Nazionale,' 1790, in which he stated several positions which have been since developed by Malthus, such as that population increases in proportion to the increase of production; that population does not always increase with the increase of marriages, &c. 8, Filippo Briganti, a native of Naples, published, in 1780, 'Esame Economico del Sistema Civile,' in which he refutes the theories of Mably, Rousseau, and Linguet, who asserted that the state of society, and civilization, commerce, and wealth, were the origin of all the evils with which man is afflicted. 9, Gaetano Filangieri, born at Naples in 1752, is known by his work on legislation, the second volume of which treats of political economy. He belonged to the school of the French economists, but he was not a servile follower of that school. He was a supporter of the freedom of trade; he had no prejudices against luxury, but he advocated direct taxation, or the tax on land, and he maintained that large cities were injurious to the prosperity of a country. [FILANGIERI.] 10, The Marquis Caraccioli, while he was viceroy of Sicily, wrote 'Riflessioni sull' Economia e l'Estrazione dei Frumenti della Sicilia fatte ad occasione della Carestia del 1784 ed 1785.' The author, being struck with the fact that Sicily, once the granary of Rome, should be so frequently afflicted with scarcity and famine, sought to investigate the causes of this great change. He recommended freedom of internal trade, but with regard to the exportation of corn, he thought it might be suspended at times by an act of government from prudential motives. 12, Saverio Scrofani, on the contrary, in a 'Memoria sulla *Libertà* del Commercio dei Grani della Sicilia,' published in 1795, advocated an entire and permanent freedom in the corn-trade, quoting the example of Tuscany, where that system had been in practice since 1767, and had been attended with the best results. 13, Maurizio Solera, a native of Piedmont, wrote, in French, 'Essai sur les Valeurs,' which he presented in 1786 to King Victor. He proposed an agricultural bank in order to make up for the scarcity of bullion. But his project was not carried into effect. 14, Lodovico Ricci, a native of Modena, was named, by the Duke Ercole III., member of a commission appointed to inquire into the charitable institutions of the town of Modena. Ricci was the reporter of the commission, and his Report was published and dedicated to the duke: 'Riforma degl'Istituti Pii della Città di Modena,' 1787. He was one of the first in Italy (Ortes and Genovesi had already expressed opinions similar to his) who censured indiscriminate charity as encouraging idleness and improvidence, and thus creating pauperism. Italy abounded at that time, more perhaps than any country in Europe, with charitable institutions. In Modena, which had in the time of Ricci a population of 40,000 inhabitants, there were 7000 destitute persons. Ricci demonstrated from historical facts that pauperism increases in proportion to the facility of obtaining relief. He censured legacies for portioning poor girls, and other premiums on marriage, and said that the increase of population should only be the result of labour and frugality, by which the means of subsistence are increased. He proposed that charitable institutions should be supported by private charity, and not by the government, which should not do more than establish workhouses to give employment to paupers and vagrants, instruct the poor classes, and endeavour to raise their moral condition. The advice of Ricci was acted upon by the government of Modena. 15, Giuseppe Palmieri, born in 1721, in the province of Lecce, in the kingdom of Naples, filled several offices in the administration of his country, and wrote observations on the tarif and on national wealth: 'Osservazioni sulle Tariffe con applicazione al Regno di Napoli,' and 'Sulla *Ricchezza* Nazionale.' In speaking of commerce, he says that a full and universal liberty would be the best system, but as this liberty is not admitted by any nation, the nation that should alone put it in practice might find it turn to its disadvantage, and its condition would be that of a lamb among wolves. He therefore advises not the prohibitive but the restrictive system, or in other words, a system of custom-house duties on the principle of reciprocity. 16, Count Mengotti of Feltra, in the Venetian state, wrote, in 1791, a book against the exclusive mercantile system, which he styled 'Il Colbertismo,' from the name of Colbert, the great patroniser of that system. This work was written in reply to a query proposed by the Economical Society of Florence, which was put in the following words: 'Whether in a state which, by its locality and the nature of its soil, is susceptible of increase of produce and population, it be most adviseable to favour manufactures by certain restrictions on the exportation of the raw materials, or to leave it an entire freedom?' Mengotti recommended perfect freedom of trade, and his book obtained the prize. It is one of the best written works of the Italian political economists. Mengotti, Beccaria, and Galiani are three writers who, by their style, have succeeded in enlivening an abstruse subject and making their dissertations entertaining as well as instructive. Mengotti wrote also a memoir, 'Sul Commercio dei Romani,' which obtained, in 1787, the prize from the Academy of Inscriptions and Belles

Lettres of Paris. Mengotti maintained, that until the first Punic war the Romans had no commerce in an extended sense; that from the first Punic war to the battle of Actium their commerce consisted in carrying home the spoils of other nations; that from Augustus to Constantine their trade was mainly passive and ruinous; they produced nothing, and bought foreign luxuries and even the necessaries of life with the money they extorted from the subject provinces, and at last they fell gradually again into poverty and barbarism.

The above are the principal Italian political economists of the eighteenth century. The complete collection of all the Italian writers on political economy was edited by Custodi, in 50 volumes, 8vo. Melzi, the vice-president of the Italian republic, supplied the author with the necessary funds for the undertaking. Custodi was afterwards made by Napoleon counsellor of state of the kingdom of Italy, baron, knight of the iron crown, and secretary of finance.

In England the science of political economy made a marked progress in the latter part of the eighteenth century through the exertions of Adam Smith, who is considered as the founder of the modern school. In 1776 Smith published his great work, with the modest title of 'An Enquiry into the Nature and Causes of the Wealth of Nations.' In the first book he treats of the division of labour and its wonderful effects, of the real and nominal price of commodities, the wages of labour, the profits of stock, and the rent of land. Book ii. treats of the nature, accumulation, and employment of stock or capital. Book iii. is in a great measure historical, and treats of the different progress of opulence in different nations. Book iv. is employed in discussing the various systems of political economy. Smith did not follow implicitly either the mercantile system or that of the economists; he showed, in opposition to the latter, that the labour of manufacturers and merchants is productive and is a source of wealth, but he at the same time considered agriculture as the most productive kind of labour, and the home trade as more productive than foreign trade. These positions have been combated by writers who have adopted many of his general views. On the subject of foreign trade modern writers on political economy are divided, some maintaining that all foreign trade is advantageous to a country precisely in the degree in which it is profitable to those who are engaged in it, and independently of war and peace and other national vicissitudes; whilst others contend that the immediate interest of the trader is not in all cases a criterion of the permanent national interest.

Adam Smith's doctrine of universal free trade has found many opponents, and is in fact still a theory, for it is not in practice in any country. His definition of productive and unproductive labour has been contradicted by Malthus, in his 'Principles of Political Economy,' and in France by Say and others. Smith considered commerce as an exchange between producers of various commodities, but not as a cause of fresh production by stimulating new wants in the producers. His doctrine of the 'natural rate of wages' has also been controverted. (McCulloch's 'edition' of Smith's 'Wealth of Nations,' with a *Biography of the Author, and Notes and Supplementary Dissertations*, by the editor.)

In 1798 Malthus published his 'Essay on the Principle of Population,' in which he demonstrated that 'an increase in the means of subsistence is the only sure criterion of a real permanent and beneficial increase in the numbers of any people.' He stated that the population never falls below the level of subsistence, but that it tends, on the contrary, always to exceed it, and is only kept down by moral or physical checks. A consequence of these positions is, that any artificial stimulus to the increase of population by premiums on marriage, laws against celibacy, &c., is injudicious. These inferences had been anticipated by the Italian political economists Ortes and Ricci.

In France, J. B. Say published, in 1802, 'Traité d'Economie Politique,' in which he expounded the principles of Adam Smith, adding many original and important illustrations, especially on the nature and causes of gluts resulting from over-production, which, he maintained, can only be partial and temporary, and can never occur in every species of commodity at once. Say has written several other works on political economy. Garnier also translated the work of Smith into French.

In 1815 appeared an 'Essay on the Application of Capital to Land,' by Mr. West, Oxford, 1815, and about the same time Malthus published 'An Enquiry into the Nature and Progress of Rent,' a subject which was afterwards investigated and expounded by Mr. Ricardo, in his 'Principles of Political Economy and Taxation,' published in 1817, and which is generally considered as the most important work on political economy since the time of Adam Smith. [RICARDO.]

Among other contemporary writers on political economy may be mentioned, in England, Mill [MILL], McCulloch, Senior, Tooke, and Torrens. In France, Sismondi has written several works on political economy: 'De la Richesse des Nations, ou Nouveaux Principes d'Economie Politique;' and 'Etudes sur l'Economie Politique,' which latter work contains many interesting facts, exhibited and commented upon in the usual attractive if not always strictly logical manner of the author. Ganilh published a general review of the principal systems of political economy: 'Des Systêmes d'Economie Politique, et de la Valeur comparative de leurs Doctrines,' 2 vols. 8vo., 1821, a work well deserving a perusal, being written in a temperate spirit and unassuming tone.

In Germany, Storch published, in French, 'Cours d'Economie Politique,' 6 vols., Petersburg, 1815, and also 'Betrachtungen über die Natur des Nationaleinkommens,' Halle, 1825. Schmalze wrote 'Staatswirthschaftslehre,' 2 vols., Berlin, 1818; and Jakob, 'Grundsätze der Nationalökonomie,' Halle, 1825.

The Spaniards had two writers on political economy towards the end of the last century, Ulloa and Ustariz. The latter wrote 'Teorica y Practica de Comercio y de Marina,' fol., Madrid, 1791.

Political economy has not been neglected in the United States of North America, but few works, we believe, have yet been produced that have attracted much attention in Europe. Tucker's 'Laws of Wages, Profits, and Rent investigated,' and his 'Theory of Money and Banks investigated,' are valuable contributions to the science.

In Italy, the principal writer of the present century on political economy is Melchiorre Gioia of Piacenza, who died in 1824. Gioia was a jurist, a moralist, and a politician, as well as a political economist, and a notice of his works and a short account of his life are given under his name. Here however we shall dwell at more length upon his great work on political economy, 'Nuovo Prospetto delle Scienze Economische,' 6 vols. 4to., Milan, 1815-17. Gioia quotes most of the writers, Italian and foreign, who had preceded him, and endeavours to condense their various systems and opinions into a series of principles with their legitimate deductions. He lays down the following objects of the science:—1, To diminish the labour and the time employed in the production, as well as to diminish the quantity of the raw elements employed; in short, to produce with as little labour, time, and cost as possible. 2, To increase the quantity, perfection, and durability of the things produced. 3, The means of obtaining the above results consist in power, which is increased by capital, machinery, credit, association, distribution of labour, in knowledge of the means to improve, and will or activity, which is strengthened by liberty, security, and enlightened opinion of the people in general. A great part of the work is in a tabular form, with quotations and original remarks. Speaking of the influence of the government on the production, distribution, and consumption of wealth, Gioia notes a number of cases in which that influence may be useful, and a number of others in which it is injurious. Under the first head he reckons the construction of good roads, the distribution of courts of justice in each district, to save time and expense to suitors; the establishment of public libraries, consisting of useful books, of collections of natural history, and of philosophical instruments, botanical gardens, &c.; the foundation of gratuitous elementary schools in every commune, and of schools of arts and trades in every town; freedom of the press; the sending well-informed travellers into foreign countries to examine and report the discoveries and improvements made in each. Among the cases in which the influence of the government is injurious, Gioia reckons—1, Too heavy taxation, which, by gradually diminishing the disposable capital, prevents its being employed in making improvements. 2, The grant of public money to monastic establishments. 3, The unequal distribution of public burthens. 4, The payment of the judges by fees on the causes which they decide, which is still the case in several countries of the Continent, instead of a fixed salary sufficient to place them above temptation. 5, The inculcation or toleration of popular superstition, false miracles, and impostors. 6, The tribunal of the Inquisition and other inquisitorial censorships, index of forbidden books, &c. Gioia is an advocate for large masses of property, large manufactories, and great commercial cities. His exposition of the advantages of large farms over small ones induced the government of Piedmont to repeal the decree by which the rice-grounds belonging to the crown or the communes were to be parcelled out into small holdings. Gioia gives the preference to arts over agriculture, and he is the only one among the Italian political economists who has established the principle of the 'association of labour' (as in the case of joint-stock companies) as an important source of wealth, and has descanted upon its advantages. Gioia wrote also his 'Filosofia della Statistica,' which may be considered as an appendage to his work on political economy. [GIOIA.]

The other Italian writers on political economy in the present century are, 1, Ressi, who in 1808 published a work 'Dell' Economia della Specie Umana,' 4 vols. 8vo.; 2, Carlo Bosellini of Modena, who published, in 1817, 'Nuovo Esame delle Sorgenti della Privata e Pubblica Ricchezza;' 3, Giuseppe Pecchio, who wrote, 1, 'Saggio Storico sull' Amministrazione Finanziera dell' ex-Regno d' Italia, dal 1802 al 1814,' London, 1826, in which he treated of various subjects connected with political economy; 2, 'L'Anno Mille Ottocento Ventisei dell' Inghilterra,' Lugano, 1827, in which he treats of the commercial crisis which took place in England in 1826, and of its causes, effects, and remedies; 3, 'Storia dell' Economia Pubblica in Italia,' Lugano, 1829, a work to which the writer of this article is mainly indebted for his account of the Italian writers on political economy. At the end of the work Pecchio draws a parallel between the Italian and the English economists, from which we give the following extract, without any opinion on the correctness of all the author's views:—'The principal difference between the English and the Italian writers consists in the definition of the science and the manner in which they treat it. The English make political economy a science distinct from all others, the science of enriching nations; the Italians consider it as a complex science, and they treat it in connection with morality, civil administration, and general happiness. The English, being intent upon the object of wealth, approve of large divisions of property, and consequently of entails, because large properties afford a greater net profit in the shape of rent, without concerning themselves with the political and moral consequences of this mode of distribution. The English encourage a manufacturing population, because it increases the wealth of the country, without heeding the deterioration of the vigour and health of the people in crowded and heated work-rooms; they favour the use of machinery, because they produce at a much less cost than manual labour, without reflecting on the danger of over-production, and of the sudden stagnations of trade, by which thousands of workmen are thrown into distress. They look upon the workman himself as a productive machine, condemned to a labour, often excessive, imprisoned in sultry cotton-factories, or buried many fathoms deep in the bowels of the earth, to extract coal, tin, or iron. And if they recommend that the workman be well fed, this is in order that he may work harder and produce the more, a species of philanthropy similar to that of the post-master, who feeds his horses well in order that they may do most work. Some of the English seem to wish to transform the whole agricultural population into mechanics, and to work even the fields by means of machinery, without reflecting that by so doing they would substitute an emaciated, weak, and short-lived population for one vigorous and hale. Is wealth the only thing desirable? But supposing that it were so, let us reflect that the increase of wealth thus produced is not subdivided among those who labour; that they only get a bare subsistence, and all the rest of the profit is accumulated in a few hands. . . . . . The Italian writers, on the contrary, consider the science of political economy in all its relations to society; they do not seek wealth only, but the welfare of the greatest possible number of individuals. They consider every principle, every law, under several aspects, and with a view to its consequences. If they treat of the corn-trade, they go back to the origin of the right of property, and end with the consideration of the question whether it be good policy to let the subsistence of a whole country depend on foreign importation, which may be suddenly stopped by various accidents. If they treat of the division of property, they investigate the influence of the law of primogeniture on public morals and domestic harmony. In discussing the subject of the greatest produce of land, they give the preference to the subdivision of land among many proprietors, because it feeds a more numerous, healthy, and peaceful population. A fact or a measure appears very different when considered merely in an economical point of view, from what it shows itself when considered in both a political and economical aspect. For instance, during the discussion concerning the liberty of the press in France in 1827, an English economist would merely have observed that the suspension of that liberty would throw out of occupation about 100,000 individuals, and withdraw about two millions sterling a year from circulation. But was not the political evil resulting from that suspension incomparably greater?'

Perhaps few English writers on political economy will admit that this is an accurate statement of their opinions and of the objects of the science as they conceive them. They would also contend that the objects of the science as conceived by the Italian economists are too numerous and too vague to allow of any scientific treatment, and that subjects are blended together by the Italian writers which are capable of being separated and of being confined within distinct and definite limits. Such an objection to the system of the Italian economists is well founded; and the objects of the English economists may be completely defended if their views are simply limited to investigating the elements on which depend the actual production, distribution, and accumulation of wealth in any given community at any given time. This is a field of inquiry sufficiently extensive, and when it has been adequately examined, and not before, we can pass from the determination of what is to what ought to be any one of those elements on which national wealth depends. It would seem almost superfluous to observe that in determining what are the elements of the actual production of a nation, all the elements must be ascertained; the whole condition of the people must therefore be ascertained, that is, the whole political system must be examined, in order to ascertain what it is, and the state of all the several classes of the community must be ascertained; every law that interferes with a man's actions must be examined, and every restraint that is laid on the disposal of his property. But such an inquiry would be infinite, and yet such an inquiry is necessary in order to ascertain what *is*, and it is quite a distinct matter from determining what *should* be. It follows from these remarks that the English writers have conceived the science in a way much more limited but better defined than the Italian, and yet that even the English writers very inadequately investigate any one branch of political economy, even as they conceive it. Still their inquiries on any given branch of the subject may terminate in a result approaching to the truth, and such a result may be capable of a practical application.

A distinguished English economist has at the end of his work an observation which coincides with some of those of Pecchio. Speaking of those injudicious mercantile regulations which have been long established, and, although found to be pernicious, cannot be removed without producing a greater evil for an interval of considerable length, Malthus goes on to say, 'Theoretical writers are too apt in their calculations to overlook these intervals, but eight or ten years, recurring not unfrequently, are serious spaces in human life. They amount to a serious sum of happiness or misery, according as they are prosperous or adverse, and leave the country in a very different state at their termination. In prosperous times, the mercantile classes often realise fortunes, which go far towards securing them against the future; but unfortunately the working classes, though they share in the general prosperity, do not share so largely as in the general adversity. They may suffer the greatest distress in a period of low wages, but cannot be adequately compensated by a period of high wages. To them, fluctuations must always bring more evil than good; and with a view to the happiness of the great mass of society, it should be our object, as far as possible, to maintain peace and an equable expenditure.' (Malthus, *Principles of Political Economy*, the last paragraph.)

POLIZIA'NO, or POLITIA'NUS, ANGELO, born at Montepulciano in Tuscany, in 1454, was the son of Benedetto Ambrogini, a doctor of law. In after-life he dropped his paternal name, and assumed that of Poliziano, from his native town Mons Politianus. Lorenzo de Medici took care of his education, placed him under good preceptors, and provided for all his wants. He afterwards entered into clerical orders, took his degree of doctor of law, and was made a canon of the cathedral of Florence. He was entrusted by Lorenzo with the education of his children, as well as with the care of his library and collection of antiquities, and he was his guest and companion for the remainder of his life. Poliziano had studied Latin under Cristoforo Landino, Greek under Andronicus of Thessalonica, and philosophy under Ficino and Argyropulus of Constantinople. He was afterwards appointed professor of Latin and Greek at Florence, a chair which he filled with great reputation. He wrote scholia and notes to many antient authors, Ovid, Catullus, Statius, Suetonius, Pliny the Younger, and the 'Scriptores Historiæ Augustæ;' he translated into Latin the history of Herodian, the manual of Epictetus, the aphorisms of Hippocrates, some dialogues of Plato, and other works from the Greek. The 'Miscellanea' of Poliziano, published at Florence, in 1489, consist chiefly of observations he had made on the antient authors, which he arranged for the press at the request of Lorenzo. Merula made an attempt to depreciate this work, which led to an angry controversy between the two scholars, in the midst of which Merula died. Politianus had also a violent controversy with Bartolomeo Scala, in which the two disputants abused each other in Latin, according to the custom of scholars in those times.

Poliziano was conceited and vain, and very irritable, and his temper led him into an unbecoming altercation with Madonna Clarice, Lorenzo's wife, because she interfered in the education of her children, a thing which Poliziano seemed to think preposterous in a woman; and at last his behaviour to her was so impertinent that she turned him out of her house in the country, and she wrote to her husband at Florence to inform him of what she had done. Lorenzo, perceiving that a reconciliation between the offended woman and the irascible scholar was impracticable, gave Poliziano apartments in one of his houses at Fiesole, where he wrote his Latin poem 'Rusticus.' During Lorenzo's last illness, Poliziano attended the death-bed of his patron, who gave him tokens of his lasting affection. Poliziano wrote an affecting monody on Lorenzo's death, and not long after died himself, in September, 1494, at the age of forty, and was buried in the church of San Marco, agreeably to his request. Jovius and others have told several improbable stories as to the immediate cause of his death. (Corniani, *Secoli della Letteratura Italiana;* Roscoe's *Life of Lorenzo de' Medici.*)

The other works of Poliziano are—1, 'Panepistemon,' in which he describes a category of all the various branches of human knowledge; 2, 'Sylvæ,' odes, epigrams, and other short Latin poems; 3, his Italian poetry, especially his poem on the Giostra, or tournament of Giuliano de' Medici, which is much admired. He also wrote the 'Orfeo,' which is considered as the earliest specimen of the opera, or Italian musical drama. His Latin works, including 12 books of Letters, were published at Paris, fol., 1512.

POLLARDS are trees which have had their tops repeatedly cut off for the sake of the faggot-wood, which is used for burning and heating bakers' ovens. The appearance of an old pollard may, in particular situations, be thought picturesque, but nothing can be more unsightly in a landscape than rows of pollards bordering every inclosure, as is seen in some countries. It is only in the case of a few trees of quick growth, such as willows and poplars, that there is a profit in making pollards of them. To have oak, ash, and elm polled, which if left to grow would in time produce valuable timber, is a very great loss to the proprietor of the land, and but little profit to the tenant. Supposing an oak polled when twenty years old, and lopped every ten years after, there will be seven loppings only, worth a few shillings each, in the first century; whereas the oak, if left to acquire the age of one hundred years, would have afforded excellent timber for ship-building, and produced five times as much money as all the loppings put together. It is usual to allow tenants to lop such trees as have been lopped before, but it would be much more profitable to all parties if the pollards were all rooted up, and a few timber-trees planted at considerable distances from each other in the hedgerows. Where wood is required for fuel, it is better to plant a good coppice interspersed with timber-trees; and if this be done judiciously on good sound land, the quantity taken from the farm for this purpose will be as profitable as if it had been kept in cultivation. Trees are often planted in soils which are not worth cultivating; and hence the profit from a good coppice is usually underrated; but if the damage done to the land by the roots and shade of trees be taken into the account, it will be found that it is more profitable to have the wood growing by itself.

On the margin of low rivers running through marshy grounds, it may be profitable to plant willows, poplars, and other soft-wooded and rapidly-growing trees, in order to lop them at stated intervals. Their timber would be of little value if they were left in their natural state; but being lopped every seventh year, they produce rods and faggots, which are readily disposed of. Hence the common saying that 'a willow will buy a horse before an oak will buy the saddle.'

To manage pollards advantageously the head of the tree should be cut off at a moderate height while the tree is young, and the shoots which spring from the crown must be frequently cut off before they begin to branch out. Thus a good head is formed, throwing out many shoots, which may then be left to grow till they are of a useful size. The willow takes root so readily, that if a branch twelve or fourteen feet long is put two feet into the ground, it will grow, and form a tree at once, which after a few loppings will become a pollard.

If the appearance of rows of pollards is unsightly, the cutting the side branches of trees in hedgerows, leaving only a little tuft at the top, is much worse. No branch above ten feet from the ground should ever be permitted to be cut by a tenant, nor the top of any tree to be cut off in order to make a pollard of it, and a clause to that effect, with a severe penalty, should be inserted in every lease.

POLLEN is the organic matter by which impregnation is effected in the vegetable kingdom. It is to the naked eye a very fine powder, and is usually enclosed in the cells of the anther; but examined with the microscope, it is found to consist of hollow cases, usually spheroidal, filled with a fluid in which are suspended drops of oil from the 20,000th to the 30,000th of an inch in diameter, and grains of starch five or six times as large. The shell, or *extine*, of these cases is lined in most instances with a delicate membrane, or *intine*, which, when the pollen falls upon the stigma, protrudes beyond the extine at some point or points of the surface, and lengthens into a tube of extreme tenuity, which penetrates the stigmatic tissue, and is called the pollen-tube. This emission of a tube takes place in from six to twenty-four hours after contact between the pollen and the lubricated face of the stigma. The pollen-tubes continue to lengthen until they reach the foramen of the ovule, which they enter, placing themselves in communication with the apex of the nucleus of the ovule, where eventually the vegetable embryo makes its appearance. The contents of the original case of the pollen are emptied into the tube, where they disappear.

The pollen grains, although usually spheroidal, also assume other figures; in some plants they are depressed, in others cylindrical, in others triangular; in most instances they are simple; but in Inja, Acacia, and the allied genera, and in Orchidaceæ, there are several grains adhering in definite or indefinite numbers. We generally find pollen lying loosely in the cells of the anthers; but in the Asclepiadaceous order the grains are enclosed in a bag consisting of the lining of the anther-cell.

The minute oily and amylaceous molecular matter that is suspended in the fluid with which it has been stated that the pollen grains are filled, moves actively, each particle upon its own axis, and this has given rise to the idea that these molecules were of an animalcular nature. They appear however to be in no respect different from similar matter in other parts of the vegetable fabric, except in the minuteness of their division.

(Lindley's *Introduction to Botany*, ed. 3, book i., cap. 2; Fritzsche, *Ueber den Pollen*, 4to., 1837, St. Petersburg.)

POLLENZA. [MALLORCA.]

PO'LLIA, a genus established by Mr. J. E. Gray for certain species of Lamarck's *Canalifera*. The shells which Mr. Gray proposes to comprehend under this generic appellation differ from *Triton* in the absence of external varices, and from *Purpura* in the presence of crenulations on the columella. There are also crenulations on the outer lip.

Example, *Pollia articulata* (*Fusus articulatus*, Lam.).

POLLI'CIPES. [Cirripeda, vol. vii., p. 208.]

PO'LLIO, CAIUS ASI'NIUS, was born B.C. 76, and appears to have been descended from a family of no great consequence. (Vell. Pater., ii. 128.) He is called by Catullus a Marrucinian, and was probably a descendant of Herius Asinius, who commanded the Marrucini in the Marsic war, and was killed in battle. (Livy, *Epit.* 73.)

We first read of Pollio as the public accuser of C. Cato (B.C. 54), who was acquitted through the influence of Pompey. (Tac., *Dial. de Orat.*, 34; Cic. *ad Att.*, iv. 15, 16, 17.) On the breaking out of the civil war between Cæsar and Pompey, Pollio took the side of the former, and accompanied him in the passage of the Rubicon. (Plut., *Cæs.*, 32.) He was afterwards sent by Cæsar, under the command of Curio, to Sicily and Africa, and after the defeat of the latter by Juba, he escaped with a few of the forces to the neighbourhood of Utica, and thence passed over to Italy to join Cæsar. (Appian, *De Bell. Civ.*, i. 45, 46.) He was present at the battle of Pharsalia (Plut., *Pomp.*, 72), and two years afterwards (B.C. 46) he accompanied Cæsar into Africa and Spain, and on the return of Cæsar to Italy appears to have been made one of the fourteen prætors who were appointed by Cæsar at that time. (Drumann, *Geschichte Roms.*, vol. ii., p. 6.) Pollio probably did not return to Italy with Cæsar, since we find him in the following year (B.C. 45) acting as Cæsar's legatus in Spain, where he carried on the war against Sextus Pompeius. (Dio., xlv. 10; Vell. Pater., ii. 73.) On the death of Cæsar (B.C. 44), he appears, if his letters to Cicero contain his real sentiments (*Ad Fam.*, x. 31, 32, 33), to have been inclined to support the senatorial party; but after Octavianus united himself to Antony, Pollio no longer hesitated to support the latter. He soon afterwards received from Antony the government of the province of Gallia Transpadana, and was nominated by the triumvirs as one of the consuls for B.C. 40. During his consulship, Virgil addressed to him the fourth Eclogue. In the following year Pollio was sent by Antony against the Dalmatians, whom he conquered, and obtained the honour of a triumph. (Dio., xlviii. 41; Appian, *De Bell. Civ.*, v. 75; *Fast. Capitol.*; Hor., *Carm.* ii. 1, 15, 16.) He appears to have retired about this time from public affairs. He took no part in the war between Augustus and Antony, and when asked by the former to accompany him to the Actian war, he declined doing so on account of his early friendship with Antony. He died A.D. 4, at his Tusculan villa. (Clinton's *Fast. Hell.*)

Pollio was a great patron of learning and the fine arts, and was also the author of several works which were greatly praised by his contemporaries. He appears to have possessed a fine collection of antient statues. (Pliny, *Hist. Nat.*, xxxvi. 4, §6.) He founded the first public library at Rome, in the Atrium Libertatis on Mount Aventine. (Isid., *Orig.*, vi. 5; Ovid, *Trist.*, iii. 1, 71; Mart., *Epig.* xii. 3, 5.) He lived on intimate terms with Virgil and Horace, the latter of whom has dedicated to him the first ode of his second book. He was a poet, an orator, and an historian, and his poetry, and more especially his tragedies, if we can trust the suspicious testimony of Virgil (*Ecl.* iii. 86; viii. 10) and Horace (*Carm.* ii. 1, 9-12; *Sat.* i. 10, 42), were far above the common standard. His history of the civil wars, which was comprised in seventeen books, is quoted or referred to by several of the antient writers. (Plut., *Cæs.*, 46; Suet., *Cæs.*, 30; Appian, ii. 82; Tac., *Ann.*, iv. 34.) His orations are frequently spoken of by Quintilian, but his style is condemned as deficient in clearness and ease. (Quint., *Inst. Orat.*, x. 1; compare Tac., *Dial. de Orat.*, 21; Senec., *Ep.* 16.) Pollio also appears to have written criticisms on the works of most of his contemporaries, and to have attacked them in a very severe manner. He found great fault with the orations of Cicero (Quint., *Inst. Orat.*, xii. 1), and said that the 'Commentaries' of Cæsar were deficient in historical accuracy. (Suet., *Cæs.*, 56.) He remarked a kind of Patavinity in the style of Livy (Quint., *Inst. Orat.*, viii. 1; i. 5), and appears to have censured Sallust for the use of antient words and modes of expression. (Suet., *De Clar. Gram.*, c. 10.) All his writings are lost, with the exception of a few letters to Cicero.

(Thorbecke, *Commentatio de C. Asinii Pollionis Vita et Scriptis*, Leyden, 1820, 8vo.; Eckhard, *Commentatio de C. Asinio iniquo opt. Latin. auct. censore*, Jen., 1743; Meyer, *Oratorum Romanorum Fragmenta*, p. 211, Zürich, 1832; Orelli, *Onomasticon Tullianum*, vol. ii., p. 76; Drumann, *Geschichte Roms.*, vol. ii., pp. 1-12.)

PO'LLIO, TREBE'LLIUS. [Augusta Historia.]

POLLONTES, De Montfort's name for a genus of microscopic *Foraminifera*. [Foraminifera, vol. x., p. 348.]

POLLUX, JU'LIUS, whose real name is Polydeuces (Πολυδεύκης), a celebrated grammarian and teacher of rhetoric, was born at Naucratis in Egypt, about the middle of the second century of the Christian æra. He was well educated by his father, and afterwards received instruction from Adrian the sophist. He was a favourite with M. Aurelius and his son Commodus, by the latter of whom he was appointed teacher of rhetoric at Athens. He died at the age of fifty-eight.

Pollux wrote several works, all of which have been lost except his 'Onomasticon' (Ὀνομαστικὸν). The 'Onomasticon,' or Dictionary of Greek words, is not arranged in alphabetical order, but is divided according to subjects, and gives the different Greek words which belong to each subject. Thus all the words relating to agriculture are classed by themselves, and in the same way all words belonging to ships, carriages, houses, &c. are treated of separately. The work is not merely a dry list of words, but contains numerous quotations from the different Greek writers, and supplies us with much information relating to antiquity, of which we must otherwise have been ignorant. It is divided into ten books, and was dedicated to Commodus during the life-time of Aurelius. The first edition was published at Venice, in 1502. The best editions are by Hemsterhusius, who has annexed a valuable Commentary, Amst., 1706, 2 vols. folio, and Dindorf, Leipzig, 1824, 5 vols. 8vo.

There was also another writer of the name of Julius Pollux, who lived in the 10th or 11th century of the Christian æra, and wrote a 'Chronicle,' or 'Universal History' from the foundation of the world to the time of Valens. This work, which has come down to us, has been edited by Bianconi, Bonn, 1779, folio; and Hardt, Munich and Leipzig, 1792, 8vo.

POLLUX. [Gemini.]

POLO, MARCO, the son of a Venetian merchant named Niccolo, who set off from Venice with his brother, in the year 1250, for Constantinople, whence, having purchased valuable jewels and precious stones, he sailed up the Euxine to La Tana at the mouth of the Tanais. From La Tana he proceeded inland to Bulgar on the Volga, the residence of Barga, the Khan of the Western Tartars, or of Kaptchak, who purchased his wares at a very liberal price. From the residence of the Khan the two Venetian travellers proceeded round the north side of the Caspian Sea to Bokhara, where they arrived in the year 1261. They remained three years at Bokhara, during which time they applied themselves to the study of the Mongol language, and in 1264 they met an ambassador sent by Hulaku, grandson of Gengis, the ruler of Persia, to Kublai, the great khan of the Mongols, or Khalkhas, who ruled over Tartary and China, and who resided at Kemenfu in Chinese Tartary. The two Venetians agreed to accompany the ambassador, and arrived at Kemenfu in the following year, 1265. Kublai received them well, and wishing to establish a connection with the Western world, of which he had only a confused knowledge, he commissioned the two brothers Polo to proceed as his envoys to the pontiff of the Christians, requesting him, in a letter, to send him a hundred men, learned in the various sciences and arts, to instruct his people. The Polo, furnished with Kublai's credentials, returned towards the west, and arrived at the coast of Syria, from whence they sailed for Venice, which they reached in 1269, after an absence of nineteen years. Niccolo found his wife dead, but she had left him a son, Marco, who was born soon after his departure.

Owing to the death of Pope Clement IV. and the long interregnum which followed, the two Polo could not execute Kublai Khan's commission, and they determined on returning to Tartary, and taking young Marco with them. But after they had landed on the coast of Syria they heard of the election of Gregory X., who was then at Ptolemais, whither they repaired, and conferred with the new pope on the subject of their mission. Gregory appointed two Dominican friars to accompany them. They set out for the interior in 1272, but the two friars, being frightened at the war which was then raging in Asia between Sultan Bibars the Mameluke, and the king of Armenia, declined prosecuting their journey, and the three Venetians proceeded alone through the regions of Central Asia. They reached the court and camp of Kublai Khan in 1275, where they met with the most favourable reception. Kublai was especially pleased with Marco, and he entrusted him with missions to various parts of China and India. Marco Polo was the first European who visited China Proper: he made memoranda of what he saw himself, and eagerly collected all the information that he could obtain about those parts which he did not visit. In reading his narrative therefore a distinction ought to be made between his own observations and those which he derived from the report of others. After a lapse of several years, an ambassador arrived at the court of Kublai Khan from Argon, the ruler of Persia, who asked in marriage a princess of Kublai's family. Kublai chose a princess named Cagatin, and prepared to send her to Persia by sea, with several ambassadors and a large retinue. The three Polo obtained, though not without difficulty, permission to form part of the escort. They set out in 1291, traversed China, embarked on the coast of Fo-kien, which lies opposite to the island of Formosa, and thence they proceeded through the straits of Malacca to the island of Ceylon, and from thence to Ormuz in the Persian Gulf. On landing they proceeded to Teheran, where they found that Argon was dead, and some time after, hearing also the news of the death of Kublai, the three Venetians thought of returning home, and at last arrived at Venice in the year 1295. War was then raging between Venice and Genoa. Marco Polo obtained the command of a galley forming part of the squadron commanded by Andrea Dandolo, which was defeated by the Genoese under Lamba Doria, off the island of Curzola in the Adriatic. Marco Polo was carried prisoner to Genoa. In his captivity he used to relate his adventures, and was eagerly listened to. He sent to Venice for his memoranda, which he had taken down in his travels, and having made acquaintance with a fellow-prisoner of the name of Rustichello, a native of Pisa, who had been taken, with thousands of his countrymen, in the battle of Meloria, he dictated to him the narrative of his travels, and lent the MS. to read to the curious.

After peace was made between Genoa and Venice, Marco Polo returned home. His father, Niccolo, was still living, but he died in 1316. Of the latter period of his son Marco's life nothing more is known, except that after his return to Venice he applied himself to correct and improve the text of his narrative, of which it appears that a French translation was made under his direction, and given by him to Thibault, lord of Cepoy, who was appointed by Catherine Courtenay her vicar-general in the possessions which still remained to the Latins in the East. The work is entitled, 'Marco Polo, delle Meraviglie del Mondo da lui descritte;' and in other copies, 'Delle Cose dei Tartari e dell' Indie Orientali;' and in others, 'Il Milione di Marco Polo.' It was inserted by Ramusio, in his 'Raccolta di Navigazioni e Viaggi,' 3 vols. fol., Venice, 1550-59. But the best edition of Marco Polo is that by Count Baldelli, 4 vols. 4to., Florence, 1827, entitled 'Il Milione di Messer Marco Polo Veneziano,' with notes and illustrations, and a biography of Polo: it is also accompanied by a history of the intercourse between Europe and Asia in the middle ages, with the following title:—'Storia delle Relazioni Vicendevoli dell' Europa e dell' Asia dalla Decadenza di Roma fino alla Distruzione del Califfato.' Count Baldelli has adopted as his text a MS. written by Michele Ormanni, at the beginning of the fourteenth century, in Marco Polo's lifetime. Baldelli's work is illustrated by a map of Africa, drawn in 1351, and by another map with all the itineraries of the three Polo traced upon it. It is altogether a work of great research and very interesting. For a long time Polo was considered a liar and not worthy of confidence. But more accurate investigations have demonstrated his veracity in relating what he saw himself. Klaproth, in several articles in the French 'Asiatic Journal,' has proved Polo's accuracy with regard to China. Polo's narrative was of great use to the pope's missionaries and the Venetian travellers who followed his track in the eastern parts of Asia, and the Chinese and Arabian maps which he brought home encouraged and assisted the Portuguese navigators in finding a passage to India round the Cape of Good Hope. Marsden has published a translation of Marco Polo's narrative, accompanied by a commentary.

Polo's account of the court of Kublai Khan gives us a much higher opinion of the social state of the Eastern Tartars in his time than is generally entertained. It appears that the Mongols had shared largely in the civilization of China, and had made considerable progress in the arts and sciences.

POLTA'VA, or PULTAVA, is a government in European Russia, lying between 48° 48′ and 51° 4′ N. lat., and between 30° 25′ and 36° E. long. It is bounded on the north-west by Tschernigow, at the most northerly point by Kursk, on the north-east by the Slobode of the Ukraine, on the south-east by Ekaterinoslaw, on the south-west by Kherson, and on the west by Kiew. It is impossible to state the area in a satisfactory manner: according to the estimates made in 1804, from the great map of Russia, it was stated at 21,315 square miles; according to Reymann's map and to Schubert, in 1835, it is 17,850 square miles; Wichmann makes it only 15,500 square miles: Schmidtlin (1835) asserts that the first estimate is certainly too large, and seems to prefer that of 17,850 square miles; yet Hörschelmann (1833) and the 'Weimar Almanac for 1840' give the largest estimate. The statements of the population are equally discordant. It appears to have been ascertained, in 1796, to amount to 1,350,726. Hassel, adding the probable annual increase during twenty-four years, gives 1,933,000 as the amount in 1820. Subsequent writers, at much later dates, make the amount less: thus Köppen, in 1838, makes it only 1,621,000; but Schmidtlin, in 1835, insists that it cannot be less than 1,900,000; Hörschelmann (1833) has 1,955,000; and the 'Weimar Almanac for 1840,' quoting Bulgarin, has 1,967,000.

Face of the Country; Soil; and Climate.—This government is one continuous plain, with scarcely any irregularities of surface, except the elevated banks of the Dnieper and some other rivers. The soil consists of a thick layer of black mould on a basis of clay and sand; it is either arable land or rich meadows; the forests are few and inconsiderable. The heaths are covered with nutritious grass; those where furze and broom predominate are common only in the south-east part of the government. The principal river, towards which the whole country slopes, is the Dnieper, which however only flows along the western frontier, towards Kiew, Kherson, and Ekaterinoslaw, and is everywhere navigable. Its chief tributaries are the Trubesch and the Sula, with the Udai coming from Tschernigow, the Psiol and the Worsikla from the Ukraine, and the Orel, which forms for some distance the frontier towards Ekaterinoslaw. The Sula and Psiol are navigable in the spring, are free from rocks, and flow through a rich country. There is no considerable lake in this government. The climate is mild; in winter however, when the cold north winds sweep over the open plains, the cold is severe. The summer is very hot. Little rain falls in the summer.

Of all the provinces of Little Russia, Poltava is the most fertile and the best cultivated. The soil is so rich that it yields ample crops without manure, and it would produce much more if a better system of cultivation and a proper rotation of crops were adopted. The grains chiefly cultivated are rye, barley, and oats, then wheat, buckwheat, Egyptian barley, and millet. The inhabitants cultivate also peas, lentils, rapeseed, linseed, and tobacco. All kinds of vegetables known in Russia thrive, even the more delicate kinds, such as asparagus, artichokes, and cauliflowers; fruits of all kinds abound, but not of the best quality; from cherries, plums, melons, and berries of various kinds, liqueurs are manufactured, and excellent preserves made. The vine might thrive, if there were any mountains to afford protection against the cold north wind. The government is not wholly without forests, but the farther we go to the south-east the more bare is the country, and the eastern circles have hardly any wood but that of their fruit-trees. On the Dnieper the inhabitants use the reeds growing on its banks for thatch and for fuel; in the interior they burn cow-dung and straw.

The steppes are covered with rich pastures, and the climate, says Hassel, is so favourable that the cattle remain in the open air all the year round. In these steppes the magnificent ox of the Ukraine attains its extraordinary size; horses are bred in great numbers; and the Russian sheep appear in large flocks. Within the last twenty-five or thirty years the breed of sheep has been greatly improved by the importation of Merinos; even previous to this, most of the manufacturers at Moscow were supplied with wool from the Ukraine. The breeding of swine is not much attended to; bees are common, and many farmers have above 100 hives. Common poultry is abundant; there are likewise blue Caspian or Chinese geese and Persian ducks. Hares and partridges are abundant, and, on the banks of the Dnieper, Numidian cranes (*Ardea virgo*), swans, pelicans, red ducks, water-hens, and snipes of all kinds. Though the Dnieper and other rivers abound in fish, the Russians consume so much in their numerous fasts, that it is necessary to import large quantities. The Dnieper furnishes the *Silurus Glanis*, Linn., of the bladders of which glue is made, and the dried skin is used as a substitute for window-glass. The country is periodically infested by immense swarms of locusts; gad-flies and a kind of musquito are very troublesome. There is potters' clay, brick clay, lime, chalk, and saltpetre.

Though this fruitful province is so well peopled, very few hands are employed in manufactures. The inhabitants indeed manufacture articles of various kinds for domestic use, and it is only of their fine liqueurs and preserved fruits that there is a surplus for exportation. The distilleries of brandy are considerable. The Sula and Psiol are navigable only in the spring; the Dnieper only touches the frontier, and is scarcely navigable beyond the limits of the government on account of its cataracts. This want of inland communication lessens the value of the produce, and in former times the farmers frequently suffered their crops to rot on the ground.* A great change has however taken place within the last twenty years, because Odessa draws a great part of its supplies from this government, the prosperity of which is progressively and rapidly increasing. The chief articles of export are corn, flour, groats, brandy, linseed oil, hemp, flax, tobacco, honey, wax, wool, tallow, butter, horses, oxen, preserved fruit, and liqueurs.

The most important trading towns are Poltava, Krementschuk, and Romny. There are in all only twenty-two towns in this government, of which fifteen are the capitals of the fifteen circles: but the number of villages is not known; they are however very numerous, and though, for want of timber, the buildings are mostly of clay, they are kept very clean, both within and without; and the villages, being surrounded with orchards and gardens, have a very cheerful appearance.

The majority of the inhabitants are Little Russians, mixed however with a considerable number of Great Russians and some German colonists. At Krementschuk there are some Greeks and Armenians, and a few Jews. The Greek clergy are under the bishop of Poltava and Pereaslawl, who has 983 parishes in his diocese. Education is at a very low ebb; according to Schmidtlin, 'there were, in 1832, only twenty schools (including one gymnasium), with 110 masters and 1823 pupils, of whom only thirty-nine were girls. To these must be added five schools, under the clergy, with eighteen masters and 1044 pupils: in all 2867; that is, one pupil out of 662 inhabitants. There is but one printing-office in the whole government.'

The southern frontier was formerly defended by a chain of twenty small fortresses, garrisoned by twenty regiments, called the Line of the Ukraine, which extended from the Dnieper to the Donetz; but this defence being long since useless, the garrisons have been withdrawn, and the fortresses suffered to fall to ruins; of many of them not a trace remains.

Poltava, the capital of the government, is situated in 49° 30′ N. lat. and 34° 15′ E. long., near the confluence of the rivers Poltawka and Worskla. It is built of wood, but the streets are wide and straight, and in the centre there is a good square surrounded with stone houses, and in the middle of it a handsome monument, of granite, in honour of Peter the Great. It is surrounded by a rampart, and there was formerly, says Schmidtlin, a citadel in the centre, built on a small eminence. Hörschelmann however says 'there is, in the middle of the town, an earthen fort, with batteries.' This town made a vigorous resistance to Charles XII., which led to the battle of Poltava, in which the Swedes were totally defeated, and Charles obliged to seek refuge in Turkey. A fine obelisk is erected on the field of battle, near which divine service is performed annually in commemoration of this victory. Poltava has ten churches (including the cathedral), a convent, a gymnasium, and a school. The inhabitants, 10,000 in number, have considerable distilleries and tanneries, and carry on an extensive trade in the produce of the country. The town is surrounded with vast cherry-orchards, from the fruit of which a very strong ardent spirit is distilled. There are four annual fairs. In the vicinity there are extensive saltpetre works, and the village of Reschetilowka, celebrated for its fine breed of sheep.

The following are the other chief towns: Mirgorod, on the Khorol, has 7400 inhabitants, and holds great horse-fairs. Lubuyg, on the Sula, has 6000 inhabitants. Pereaslawl, at the confluence of the Alta and the Trubesch, has a great trade in cattle and corn, and 8000 inhabitants. Krementschuk, a well-built town, at the confluence of the Kaganlik and the Dnieper, has a considerable trade and a wool-fair, and 8000 inhabitants. Its liqueurs and preserved fruits are very excellent. Romny, or Romen, on the Sula, a small town, with not above 2000 inhabitants, is celebrated for its fairs, especially that held at the Ascension, where goods to the amount of more than fifteen millions of rubles are offered for sale.

(Hassel; Cannabich; Stein; Schmidtlin.)

POLYADE'LPHIA, the name given by Linnæus to the eighteenth class of his sexual system. It was so named from *πολύς*, 'many,' and *ἀδελφός*, a 'brother,' in allusion to the stamens being collected into several parcels. In consequence however of the difficulty of ascertaining this point of structure in many cases, the class has been suppressed by some Linnean botanists.

POLYÆNUS was the author of a work called *Στρατηγηματικά*, or *Στρατηγήματα* (Stratagems of War), in eight books. He lived about the middle of the second century A.D. Respecting the circumstances of his life we know nothing except what he himself tells us in the introduction to his work, which he dedicated to the emperors M. Aurelius Antoninus and L. Verus. He there says that he was a native of Macedonia, and at an advanced age when he wrote his book. It contains an account of the various stratagems of war from the remotest times down to his own, and is a compilation made without any taste or judgment: it is however not confined to real stratagems; it contains sayings, apophthegms, and many other things which are anything but what the title-page promises. But as the author collected his materials from sources which are now lost, we have reason to be grateful for the preservation of many facts which would otherwise be unknown to us, though it is evident in many passages that Polyænus must have misunderstood or misrepresented his authorities. His style is rhetorical, but notwithstanding its numerous solecisms and errors, it is better than that of many other writers of the same age. The first edition of Polyænus was published by Casaubonus at Lyons, in 1589; another by Maasvicius, with a Latin translation, appeared at Leyden, in 1690. A reprint of the latter, with an improved Latin translation, was published by Mursinna, at Berlin, in 1756. The best edition however is that by Coraes, Paris, 1809. Polyænus has been translated into English by R. Shepherd, London, 1793, 4to., and into German by Seybold, in 2 vols., Frankfort, 1793 and 1794.

POLYA'NDRIA, the name given by Linnæus to the fourteenth class of his sexual system. Although the name means literally many stamens or males, yet it is applied, in a restricted sense, to those plants only which have many stamens arising immediately from below the ovary.

POLYA'NTHES TUBERO'SA, or the Tuberose (a corruption of *Plante Tubéreuse*), is a tuberous-rooted plant highly prized for the delicious fragrance of its flowers, on which account it is cultivated in the warmer parts of both the old and new world. Doubts are entertained regarding its native country. It appears to have been first seen in Europe by Clusius, who received it from Simon de Tovar as an Indian plant, but whether from the East or the West is unknown. It is extensively cultivated in the East Indies, whence it has been supposed to be an Asiatic plant; but no traveller has found it wild there, and it has no Sanscrit name. It is therefore more probable that it is of South American origin, for it is equally common there in cultivation; and, as Sir James Smith has rightly observed, its constitution is more like a Peruvian plant than one of Ceylon or Java. Of late years a wild tuberose, Polyanthes gracilis, has been found in South Brazil, which is probably the origin of the garden plant.

The tuberose is too tender a plant to be cultivated in England in the open air; but in the south of Europe it finds a climate suitable to it; and the Genoese supply the principal part of the European market with tubers for forcing. The latter are imported into this country by the Italian oilmen, who sell them, with orange-trees, Narcissus roots, and similar products of the south.

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* Only two years ago a friend of ours saw large quantities of corn abandoned, because the prices in the ports of the Baltic would not repay the expense of conveyance.

In selecting tuberoses for planting, the largest tubers should be preferred, as the smaller ones will often not flower. All offsets should be carefully picked off, so as to concentrate the vegetation in a single eye. They should be planted in March, in pots, in rich light soil, and forced in a hotbed, with as much bottom heat as is given to a melon. The eye should be about an inch below the surface of the soil. Very little water should be given till the plants are growing; but when once in a state of vigour, they may be supplied copiously. An abundance of light and air should be given the plants as soon as they begin to grow, and this should be sedulously attended to as long as they remain in the hotbed; it will however soon be necessary, on account of their height, to remove them to the greenhouse, where they must be placed near the glass, and their roots still exposed to a temperature similar to that from which they were taken. As soon as they show their flowers, but not sooner, they may be removed to the sitting-room, when their flowering will be completed.

POLYANTHUS, a garden variety of the oxlip primrose, with brown flowers, is one of those plants which have from time immemorial been favourites in gardens. It was probably obtained by accident, and is now propagated either by seeds or division of its root. Florists require that a good variety of this flower should possess a strong scape, a well-filled truss, a corolla with a short tube, a bright yellow eye, and a deep rich brown crimson limb, bordered with a well-defined yellow edging. They require less careful cultivation than the auricula [AURICULA], and principally need shade and rich soil. Their beauty however diminishes with their age, so that a renewal of the variety from seed is requisite every few years.

POLYANTHUS NARCISSUS is the same as Narcissus Tazzetta. [NARCISSUS.]

POLY'BIUS, the son of Lycortas, was born at Megalopolis in Arcadia. The exact year of his birth is not stated by any good authority, and the account of Suidas, who places it in the reign of Ptolemæus Euergetes (who died about 222 B.C.), is irreconcilable with what Polybius himself (xxv. 7) relates, that in the reign of Ptolemæus Epiphanes, when he was to have accompanied his father on an embassy to that king, he had not attained the legal age, which, according to Polybius himself, was thirty, previous to which the law did not allow any one to take part in public affairs. • According to the statement of Suidas however, Polybius at this time would have been about 40 years old. Now the year in which the Achæans intended to send him with his father to Egypt was 180 B.C.; and as at that time he had not attained his thirtieth year, we shall not be much mistaken in supposing, with Casaubon, that he was born about 204 B.C., so that at the time of the intended embassy he must have been about 25 years of age. He seems to have acquired the principles of political and military science at an early age; for his father was a distinguished general, and one of the heads of the Achæans, and it is expressly mentioned that he enjoyed the practical training of Philopœmen, the greatest general of the Achæans. When Philopœmen died, Polybius is said to have been one of those who carried the urn containing the ashes of the deceased to the grave. (Plut., *Philop.*, c. 21.) During the war of the Romans against Perseus, king of Macedonia, he advised his countrymen to observe a strict neutrality; but when they determined to lend their assistance to the Romans, he was entrusted with the command of the cavalry (169 B.C.), and was sent as ambassador to the consul Q. Marcius, to declare that the Achæans were ready to give their assistance as soon as might be required. (Polyb., xxviii. 3, 6.) The year following, when the two Ptolemæi, kings of Egypt, asked the Achæans for support against Antiochus, it was particularly stipulated that Polybius should be appointed commander of the horse, which shows that he had already distinguished himself in a military capacity. After the destruction of the kingdom of Macedonia, the Romans, not satisfied with having taken cruel vengeance on those Achæan states, which they suspected of having secretly supported the cause of Perseus, made out a list of 1000 distinguished Achæans, and sent them to Italy to be tried. But instead of being brought to trial, they were distributed among the towns of Italy. Polybius, who was one of the number, was more fortunate than his fellow-prisoners, for his genius and talents attracted the attention of Æmilius Paulus, who made him the instructor of his two sons Fabius and Scipio. Those young men, who became greatly attached to him, requested and obtained permission for Polybius to remain at Rome. Polybius himself (xxxii. 9, 10) relates a charming anecdote of the tenderness which Scipio, the younger of the two brothers, showed to him; and he adds that Scipio never left him afterwards, but preferred his company and conversation to everything else. During his long stay at Rome, Polybius on several occasions exerted his influence in favour of his countrymen, and at length, in 150 B.C., he succeeded, with the co-operation of Scipio, in obtaining for the Greek prisoners permission to return home; but during the period of 17 years which had elapsed since their arrival in Italy, their number had been reduced to 300. Polybius seems to have accompanied them on their return, in order to admonish his countrymen not to divide their strength, and to recognise the superiority of the Romans, whose power it would be hopeless to resist; for an inscription mentioned by Pausanias (viii. 37) recorded the regret of the Achæans at not having followed his wise advice, by which they would have escaped the catastrophe of their final political annihilation. Polybius soon returned to Rome, to accompany his friend Scipio on his military expeditions. It must have been before this time that he had conceived the idea of writing his great historical work; and for this purpose he made more profound and extensive studies than any other antient historian. He not only studied the Roman constitution, and searched the archives which were thrown open to him through his connection with the most distinguished Romans, but he undertook long journeys across the Alps into Gaul, Spain, and to the coasts of the Atlantic. It is not certain whether he made these journeys previous to the year 150 B.C., or after his return from Greece, though it seems probable that he may have availed himself of the opportunity of visiting Spain when Scipio went to that country as military tribune in 151 B.C. Five years later, when Scipio besieged and destroyed Carthage, he was again accompanied by Polybius, who seems to have taken an active part in the Roman army, for in an inscription quoted by Pausanias (viii. 30), he is called the ally of the Romans. Pliny says that during the siege of Carthage, Polybius explored the north coast of Africa, in which undertaking, as on his former journeys, he was provided with everything that could facilitate the accomplishment of his objects. Immediately after the destruction of Carthage (146 B.C.) he hastened to the Peloponnesus, where, in the mean time, a war with the Romans had broken out. But he arrived too late: Corinth had already fallen, and all he could do for his unhappy country was to endeavour to obtain from the conquerors the mildest possible conditions, and to rescue from their hands the statues of Philopœmen and Aratus, with whose memory the happiest associations of his countrymen were connected. After the Roman commissioners had left Greece, in 145 B.C., he was appointed by them to regulate the affairs of the different states. With the most indefatigable zeal he traversed the country, everywhere endeavouring to restore peace and unity, and to introduce salutary regulations. His merit on this, as well as former occasions, was duly acknowledged and rewarded throughout Peloponnesus, and statues, with inscriptions recording his exertions on behalf of his country, were erected at Megalopolis, Acacesium, Mantinea, Pallantium, Tegea, and other places. Soon after he had settled the affairs of his country, he made a voyage to Egypt, which, according to Strabo, he visited in the reign of Ptolemæus Physcon, who ascended the throne in the same year that Corinth was destroyed. The remaining years of his life he seems to have applied to the revision and completion of his historical works, unless we suppose, with Schweighaeuser and others, that in the year 134 B.C. he again accompanied Scipio on his expedition against Numantia, for which however we have no direct authority. Cicero (*Ad. Famil.*, v. 12) merely mentions a work of Polybius on the war against Numantia. The time of his death is uncertain, for the only information that has come down to us is the statement of Lucian (Macrob., c. 23), who says that Polybius, on returning from the country, fell from his horse, and shortly after died from the fall, at the age of 82. Supposing this statement to be correct, he must have died about the year 122 B.C.

The great historical work of Polybius (ἡ τῶν καϑόλου πραγμάτων σύνταξις), in 40 books, consisted of two distinct parts, the first of which comprised a period of 53 years from the beginning of the second Punic war to the overthrow of the kingdom of Macedonia, including the immediate consequences of this event, that is, the pacification of Rhodes, and the sending of the 1000 Achæan prisoners to Italy. The second part began with the war in Spain against the Celtiberians and Vaccæans, and ended with the destruction of Corinth. It is evident, from various circumstances (Niebuhr, *Hist. of Rome*, vol. iii., p. 49), and especially from the manner in which Polybius (iii. 1-5) speaks of these two divisions of his work, that they were written and published at different times, and afterwards put together to form one whole. The latter part was written after the fall of Corinth, and the former some years before that event. The first two books are an introduction to the first division of the work, and contain a sketch of the History of Rome, from the taking of the city by the Gauls to the beginning of the second Punic war. The second division of the work, the principal object of which was to describe the fate of Carthage and Greece, and the causes which led to it, was likewise preceded by a kind of introduction, consisting of a brief history of the interval between the overthrow of the Macedonian kingdom and the events which led to the fall of Carthage and Corinth. The great object of the history of Polybius was to show how the Romans, with their admirable constitution and their unity of purpose, within a short period gained the dominion over the greater part of the known world. Thus, although the history of Rome formed, as it were, the nucleus of his work, it was still essentially a universal history; and every nation, with its history and institutions, as it came in contact with the Romans, was treated with equal attention. To enable the reader to form a clear estimate of the contents of the whole work, we shall give an extract from the plan which Polybius himself laid down for it. After giving an explanation of the causes of the second Punic war, Polybius describes the invasion of Italy by the Carthaginians, and how they brought the Roman republic to the brink of destruction. The accuracy of his description of the passage of Hannibal over the Alps has been demonstrated, step by step, by General Melville. He then proceeds to show how Philip, king of Macedonia, after the end of his war against the Ætolians, entered into an alliance with the Carthaginians. 'I shall next,' says he, 'give an account of the disputes between Antiochus and Ptolemæus Philopator, about Cœle-Syria, and the war which arose out of them; of the manner in which the Rhodians, and Prusias, king of Bithynia, compelled the Byzantines to cease levying the passage-money which they had been accustomed to demand of those who sailed into the Euxine. Here we shall break off our narrative, and turn our attention to the Roman republic, and show that it was to its constitution that it owed its greatness and its dominion over the world. At the same time, we shall make some digression to show how Hiero of Syracuse lost his independence; next to which I shall describe the disturbances of Egypt, and how, after the death of Ptolemæus, Antiochus and Philip formed an alliance, with a view of dividing the kingdom of Egypt between them; how at first they acted insidiously, until at length Philip made open war on Egypt and Samos, while Antiochus invaded Cœle-Syria and Phœnicia. After this, I propose to give a brief account of what took place between the Romans and Carthaginians, in Spain, Africa, and Sicily. This will lead me to Greece, and after having related the maritime war of Attalus and the Rhodians, as well as that of the Romans against Philip, I shall describe the immediate consequences of these events; the exasperation of the Ætolians, by which they were induced to call Antiochus to their assistance, which occasioned the war between the Asiatics and the Achæans and Romans. After having explained the causes of this war, and the passage of Antiochus into Europe, I shall describe, first, his flight from Europe; secondly, how he was conquered by the Romans, and compelled to give up all Asia west of Mount Taurus; and thirdly, in what manner the Romans, after the chastisement of the Galatians, gained the undisputed sovereignty of Asia. After this shall follow an account of the calamities of the Ætolians and Cephallenians; of the wars of Eumenes against Prusias and the Gallogræcians, and of that which they carried on with Ariarathes against Pharnaces. Then, after having described the union and the arrangements of the Peloponnesians, and the prosperity of the republic of the Rhodians, I shall subjoin a short recapitulation of my whole narrative. Finally, I shall add an account of the expedition of Antiochus Epiphanes into Egypt, of the war against Perseus, and the overthrow of the kingdom of Macedonia. From the history of these events,' says the historian, 'it will be manifest how the Romans made themselves masters of the whole world.' The second division of the history of Polybius began with the war of the Romans against the Celtiberians and Vaccæans in Spain, and proceeded to describe those of the Carthaginians against Massinissa; of Attalus against Prusias; and how Ariarathes, king of Cappadocia, after being driven out of his kingdom by Orophernes, again gained possession of it; and how Seleucus, king of Syria, lost his life and his kingdom. Then followed the history of the affairs between Carthage and Rome, which ended in the destruction of the former. The whole work concluded with the history of the rebellion of the Macedonians against the Romans, and the separation of the Lacedæmonians from the Achæan league, which led to the great catastrophe by which Greece was made a Roman province. These were the chief heads; but the work was interspersed with episodes or dissertations on various subjects, such as tactics (vi. 17-40), geography (xxxiv.), political institutions, &c., which the author thought necessary to insert, partly to render his narrative more intelligible, partly to refute false opinions current among his countrymen. Whatever we may think of these episodes, looking at the whole work in an artistical point of view, we are indebted to them for the soundest information on many subjects connected with the history of antiquity, especially that of Rome; and it is only to be regretted that many points in his dissertation on Roman tactics are not quite so clear to us as we could wish.

The study and research of Polybius before he began to write his work, together with his almost unparalleled impartiality and love of truth, have given it a character of authenticity such as very few historical works, either of antient or modern times, can claim. He is a severe critic of his predecessors, with whose writings he was thoroughly acquainted; and although he himself was under the greatest obligations to the Romans for their behaviour to him, still he did not spare them wherever they deserved censure (see especially ix. 10, and xviii. 18). The love of his country moreover did not make him blind to the folly of its leaders, who endeavoured to draw it into the fatal conflict with Rome. But the distinguishing character of his work is its didactic and practical tendency (*ἱστορία πραγματική*). He did not write for the sake of amusement, or of filling the memory of his reader with a number of unconnected facts, but he traces events back to their causes, and deduces from them the most useful precepts, much in the same way as the so-called 'histoires raisonnées' of modern times, but with infinitely more wisdom and discretion. It is true that he thus wishes to guide his reader, and not to allow him to form his own opinions; but setting aside the consideration that an intelligent reader may and will always judge for himself, who would not willingly listen to the arguments and reasonings of a statesman and a general like Polybius? His work is full of the most profound political and military wisdom; or, as a modern historian expresses it, 'a code of the wisest political and military maxims;' and enables the reader not only to understand the past, but to look upon the future with the foreseeing eye of a prophet. As the object of Polybius was not to make his work popular with the multitude, but to instruct and guide men who are entrusted with the care of their country, he abstained from all rhetorical embellishments of style. He looked with contempt upon the refined affectation and hollowness of the rhetoricians of his time, for true public oratory had long ceased among the Greeks. Hence he very seldom introduced his heroes making speeches, though it still was and remained a favourite custom with his countrymen down to the latest period of their literature; but where he thinks it necessary, he gives the substance of their speeches in his own words. It is natural that under these circumstances the rhetoricians of his own as well as of a later age should have been unable to appreciate Polybius. (Niebuhr, *Hist. of Rome*, vol. i., p. 533.) Dionysius, though in many respects a judicious critic (*De Comp. Verb.*, c. 4), says that the history of Polybius is written in such a style that no one can endure to read it through from beginning to end. Polybius has also been censured for having introduced into his work a number of foreign words and expressions; but the specimens that have hitherto been collected are few, and some of them are doubtful. We may however admit that there were more of such expressions in those parts of his work which are no longer extant; but his long absence from his country, and an intense study of the institutions and literature of another nation, sufficiently account for this. Another charge which has been brought against Polybius in modern times is that of a want of sympathy with the sufferings of his own country. That this want is merely apparent, and perhaps owing to his philosophical mode of viewing things, is sufficiently evident from his whole conduct towards his country; and the fragments of his work lately discovered by A. Mai, in which he describes the sufferings of his countrymen, are full of expressions of the deepest sorrow for their calamities.

It may be chiefly owing to his style that the works of Polybius in subsequent ages were less read and copied than others of a greatly inferior character, and that to this cause we have to ascribe the loss of the greater part of them; for of the forty books, only the first five are preserved entire; and of the rest, we possess only fragments and extracts. At the time of the revival of letters, about the middle of the fifteenth century, and long before any part of the Greek text was printed, an elegant but incorrect Latin translation of the first five books was published by Nicolaus Perotti at Rome. In 1529 the Greek text, with a Latin translation of the dissertation 'De Militia Romana,' by Lascaris, appeared at Venice; and it was a year later that the Greek text and the Latin translation of the first five books by Perotti were edited by Orsopoeus. As soon as the merits of Polybius began to be acknowledged, and a desire was awakened to possess more of his work, the number of new fragments continued to increase. In 1536 eight chapters of the sixteenth book were discovered and published; and in 1549, extracts from books vii.-xvii., together with a fragment of the 19th chapter of book i., which had hitherto been wanting, were added from a MS. which had been brought over from the island of Corfu. A very important addition to the fragments of Polybius was made in 1582 by Fulvius Ursinus, who, for the first time, published the first section of the 'Excerpta,' from various antient historians, which, in the tenth century, the emperor Constantinus Porphyrogennetus had ordered to be made, and which contained a great many extracts from the history of Polybius. This section contained the 'Excerpta de Legationibus' ('Εκλογαὶ περὶ πρεσβειῶν). Casaubon, in 1609, published a complete edition of all that had till then been discovered of the works of Polybius, and made a new Latin translation of the whole. The second section of the Excerpta of Constantinus, called 'Excerpta de Virtutibus et Vitiis' (περὶ ἀρετῆς καὶ κακίας), which likewise contained a considerable number of extracts from Polybius, together with some other new fragments, were edited and translated into Latin by Henry Valesius (Valois), at Paris, in 1634. Nothing new was added but a fragment containing an account of the siege of Ambracia, by J. Gronovius, until, about fifteen years ago, when A. Mai discovered, in the Vatican library, a palimpsest of the third section of the Excerpta of Constantinus, called 'Excerpta de Sententiis' (περὶ γνωμῶν, which, among other extracts, contained a considerable number belonging to Polybius. The MS. however was in such a mutilated state, that a great part of the extracts as published by Mai are scarcely intelligible. A somewhat better edition of these Excerpta, with a Latin translation and commentary, was published at Leyden, in 1829, by J. Geel. The best edition of Polybius, containing all that was known at the time, is that of Schweighaeuser, in 8 vols., Leipzig, 1789-95: a reprint of it appeared at Oxford in 1823, in 5 vols. Among the translations of Polybius we may mention the German, by Seybold, in 4 vols., Lemgo, 1779-83; and the English, by Hampton, in 2 vols. 4to., 1772. There are also the following English translations:—'The Hystories of the most famous and worthy chronographer Polybius: Englished by Charles Watson,' 1568; 'Polybius,' translated into English by Edward Grimestone, 1634; 'Polybius,' translated by Sir Henry Sheares, with a character of Polybius and his writings by Dryden, 3 vols., London, 1698.

The greater part of the history of Polybius is thus lost. After Livy had almost reached the end of the second Punic war, he began to make use of Polybius; and he very often gave a literal translation of the Greek original: thus he has perhaps preserved more than we are aware of, as he seldom mentions his authorities. Much may also be preserved in Cicero's work 'De Republica,' as Cicero, in his historical statements, chiefly followed the authority of Polybius.

Polybius, as mentioned above, is said by Cicero to have written a separate work on the war against Numantia, but nothing is known of it. His memoirs of the life of Philopœmen (x. 24) are also lost. It is however not improbable that in the accounts which Plutarch and Pausanias give of Philopœmen, we may still possess the substance of those memoirs. Other works of Polybius mentioned by some of the antients, on tactics and subjects of geography, were probably not separate works, but dissertations which formed parts of his History.

POLY'BIUS. (Zoology.) [PORTUNIDÆ.]

POLY'BORUS. [FALCONIDÆ, vol. x., p. 168.]

POLYBRANCHIATA, M. de Blainville's name for his second order of *Paracephalophora Monoica*, consisting of the families *Tetracerata* and *Dicerata*. The first of these families consists of the genera *Glaucus*, *Laniogerus*, *Tergipes*, *Cavolina*, and *Eolidia*; the second, of the genera *Scyllæa*, *Tritonia*, and *Tethys*. [EOLIDIA; GLAUCUS; NUDIBRANCHIATA.] N.B. *Cavolina* is erroneously referred to *Psilosomata*, instead of the title which heads this article.

PO'LYBUS, or POLY'BIUS (Πόλυβος, or Πολύβιος), a pupil and son-in-law of Hippocrates, who lived about the middle of the fifth century B.C., in the island of Cos. He assisted Thessalus and Draco, the sons of Hippocrates, in establishing the antient school of the Dogmatici, which was also sometimes called the Hippocratic sect, from its professing to follow the principles that he laid down. Galen praises him, and says that he never abandoned the opinions and mode of practice of his father-in-law (*Comment. in Hippocr.*, lib. i.; *De Nat. Hom.*, p. 11, 12, ed. Kühn); but, as Eloy remarks (*Dict. Hist. de la Méd.*), if the works attributed to him are really his, it must be confessed that he does in some instances differ from Hippocrates, particularly respecting the passage of liquids into the trachea and the lungs. The following treatises, which are generally printed among the works of Hippocrates, are supposed to have been written by Polybus:—1, περὶ γονῆς, 'De Semine;' 2, περὶ φύσιος παιδιόν, 'De Naturâ Pueri;' 3, περὶ διαίτης ὑγιεινῆς, 'De Salubri Victûs Ratione;' 4, περὶ παθῶν, 'De Affectionibus;' and 5, περὶ τῶν ἐντὸς παθῶν, 'De Internis Affectionibus.' (Choulant, *Handbuch der Bücherkunde für die Aeltere Medicin, &c.*, Leipzig, 1828, 8vo.) Many persons also attribute to him the treatise περὶ φύσιος ἀνθρώπου, 'De Naturâ Hominis,' which is found among the works of Hippocrates; but, according to Galen (*loco cit.*), incorrectly. He is several times mentioned by Galen (*Opera*, ed. Kühn, tom. vii., p. 960; tom. xv., p. 11, 175; tom. xvi., p. 3): his name occurs also in Celsus (*De Med.*, p. 243, 265, 338, ed. Argent.); Cælius Aurelianus (*De Morb. Acut.*, lib. iii., cap. 9); Pliny (*Hist. Nat.*, lib. xxxi., cap. ult. in fine); and Thessalus (in *Orat. ad Athen. inter Opera Hippocr.*, tom. iii., p. 843, ed. Kühn). A Latin translation of the work 'De Salubri Victûs Ratione' was published by J. Placotomus (*Bretschneider*), Antwerp, 1561, 12mo., and it is inserted in several editions of the 'Regimen Sanitatis Salernitanum.' The whole of his 'Opuscula' were published in a Latin translation, Basil., 1544, 4to., per J. Oporinum; and there is an Italian translation by Pietro Lauro, Venez., 1545, 4to.

POLYCARPUS, one of the fathers of the Christian church, and one of a small number who were distinguished from the rest by the term Apostolic Fathers, as having been contemporaries of some of the Apostles. The period of his death is well ascertained to have been in A.D. 167, in the reign of Marcus Aurelius; the period of his birth is placed perhaps somewhat too early when it is referred to the reign of Nero. However there seems no reason to doubt that he was contemporary with Saint John, and known to him, the lengthened period of whose life connects so fortunately the men of the second century with those who had been in personal attendance on our Saviour.

It is this circumstance which gives its chief importance to the lives of these persons, and thence arises the main value of the few and in other respects unimportant writings which remain of the Apostolic Fathers. The lives form links in the chain of Christian tradition; and the writings recognise by frequent quotations the writings which remain of the evangelists and apostles.

Of the writings of Polycarp only one small epistle remains. It is addressed to the Philippian church, exhorting them to the practice of their Christian duties and the maintenance of the purity of the faith. But there is another writing of that age of which he is the subject. It a relation of the manner of his death, written by the church at Smyrna, of which he was the bishop, addressed to the church of

Philadelphia. It is a valuable and interesting memorial. There seems to have been a mad and wicked attempt to extirpate Christianity in Asia Minor. The persecution raged with peculiar violence at Smyrna. Many Christians were delivered to the lions. Polycarp, the bishop, was reserved for a more cruel death, being burned at the stake. Both these epistles may be read in an English translation in a volume published by archbishop Wake containing all the genuine remains of the Apostolic Fathers.

What further is known of him is, that when the controversy began between the Eastern and Western churches respecting the proper time for the observance of Easter—a childish matter of disputation, which however produced much ill feeling for many centuries in the Christian church—Polycarp was sent to Rome to discuss the question with Anicetus, the bishop, and other Christians there; and that while at Rome he strenuously opposed the heresies of Marcion and Valentinus. This fact is stated by Irenæus, bishop of Lyon, who was a pupil of Polycarp.

POLY'CERA. [CYCLOBRANCHIATA, vol. viii., p. 249.]

POLYCHROITE, the colouring matter of saffron [SAFFRON], which consists of the dried stigmas of the flower of the *Crocus sativus*. This substance was first examined in 1811, by Bouillon Lagrange and Vogel, who gave it the name which it bears, on account of the variety of colours which it is susceptible of exhibiting. It is procured by infusing saffron in water, evaporating the solution to the consistence of honey, digesting the residue in alcohol, and evaporating the solution to dryness.

The properties of polychroite are, that it has a very deep yellow colour; by exposure to the air it absorbs moisture, and becomes viscid. Water and alcohol dissolve it readily, but æther and oils do not; the sun's rays destroy the colour of the aqueous solution of polychroite, and it cannot be restored. Sulphuric acid renders both the aqueous and alcoholic solution of polychroite of a deep indigo-blue colour, which gradually changes to lilac; nitric acid gives them a green colour, which disappears on the addition of water; chlorine destroys the colour entirely. Lime-water precipitates a solution of polychroite, yellow; barytes-water, red; sulphate of iron, dark-brown; diacetate of lead, saffron-coloured; nitrate of mercury, red: acetate of lead produces no change in it.

When strongly heated, polychroite is decomposed, and there are produced water containing an acid, a yellow-coloured oil and a darker one, carbonic acid, and carburetted hydrogen; the charcoal remaining yields cyanogen when calcined with potash. Polychroite does not appear to have been analyzed.

POLYCHRO'MY, a modern term (from the Greek πολὺς and χρῶμα) used to express the antient practice of colouring statues and the exteriors of buildings. It is difficult to define exactly what the system of colouring was, but it appears from the remains of colour found upon antient monuments, that at the zenith of Grecian refinement, both in the polychrome sculpture and architecture, the colouring was strictly confined to the ornamental parts; since no traces of colour have ever been found upon the naked in sculpture, or upon the walls of temples when of marble.

There is scarcely any notice of the system or practice of colouring architecture in any of the antient writers. A few remarks occur in Vitruvius and Pausanias, which may be construed into an allusion to it, but they are vague, and the systems which have been laid down by several modern writers rest chiefly upon conjecture. It is more than probable, where the architectural members were subject to so great a variety of forms and proportions, that the decorations in colour, which admit of endless variety, were quite arbitrary, and the limits of the system consisted only in the architectural members to which their application was restricted. Remains of colour have been found by travellers upon ornamental work in most of the architectural ruins of Greece. Many traces were discovered by Dodwell, Stuart, Chandler, Bröndsted, Semper, and others, upon the principal Athenian monuments: upon the temple of Theseus, the Parthenon, the Propylæa, the Erechtheium, the temple on the Ilissus, the monument of Lysicrates, the outer propylæa of the temple of Ceres at Eleusis, and the greater temple at Rhamnus; also upon the temple of Apollo at Bassæ in Arcadia, the Doric ruins at Corinth, and the temple of Minerva in Ægina; upon the temples of Selinus in Sicily, and upon the basilica at Pæstum.

Upon all these temples, except the Doric ruins at Corinth, and the temple of Minerva in Ægina (commonly called the temple of Zeus Panhellenius), which were not of marble, the colouring was confined to the mouldings and other ornaments, the friezes, the metopes, and the tympana of the pediments. The exterior of the wall of the cella of the temple of Ægina and the columns of the Corinthian temple were covered with a stucco and coloured red. In a ruder age, when most temples were constructed of wood, before the use of marble or other stone, the application of colours was undoubtedly more general and much less systematic, not only among the Greeks, but with most of the nations of antiquity. In Egypt it was at all times a universal custom to have recourse to colours in the decoration of architecture. In later times amongst the Romans, in the times of Vitruvius and Pliny, the practice seems to have degenerated into a mere taste for gaudy colours, and to have been very general, as we see in the ruins of Pompeii, where however occasionally the Arabesque decorations upon the walls of the courts in the larger houses are very elegant.

With regard to the system of decorating the mouldings, it appears, from the traces found upon antient monuments, that they were painted in various ways and in a great variety of colours, whether carved or plain; and a tasteful combination of colours must have greatly heightened the effect of even the richest mouldings. These decorations were not confined to the mouldings of the entablature; the ovolo, echinus, and abacus of the capital, and the toruses of the base, were also sometimes coloured. Foliage, ova, and beads were the ordinary decorations, but on the Doric tænia a fret was generally painted; and the cymatia of the pediment-cornices were frequently ornamented with gilded metal-work; the acroteria were also surmounted with gilded figures. Upon the larger mouldings, on which foliage was painted, the outlines of the leaves were engraved in the stone. The mutules, dentils, modillions, and the soffits were also variously coloured, but the Doric guttæ were apparently generally gilded. The faciæ of the architraves and the coronæ of the cornices were left plain, but the Doric architrave was sometimes ornamented with gilded shields, as in the Parthenon at Athens, which were placed immediately beneath the metopes. It appears that all friezes which were decorated with sculpture were coloured, which was absolutely necessary to give the sculpture a proper relief; for the same reason the tympana of the pediments would also require colour. In the Doric order the tympanum would necessarily be of the same colour as the metopes: in the Parthenon they were of a pale blue; and in some of the Sicilian monuments red has been found. The metopes require colour, with or without sculpture, to throw the weight of the pediment upon the triglyphs, its natural supporters, which being left plain, united the cornice with the architrave, and gave the whole building an elegant lightness of effect which it otherwise could not have.

Polychrome sculpture was quite as general amongst the Greeks as polychrome architecture; it is frequently alluded to by almost all the antient writers, and many statues of this kind are minutely described by Pausanias. The acrolithic and the chryselephantine statues both come under this head. In the latter style were many of the most remarkable productions of antient art—the Jupiter at Olympia, and the Minerva at Athens, by Phidias; the Juno at Argos, by Polycletus, and the Æsculapius at Epidaurus, by Thrasymedes; and others described by Pausanias. In the flourishing period of Grecian art, custom seems also to have defined limits to this practice, for except in the rudest ages, the naked itself was never painted, although it appears to have been sometimes covered with an encaustic varnish. That the naked marble of the works of the greatest sculptors was not coloured, we have most conclusive proofs from Lucian, in the dialogue between Lycinus and Polystratus. (*De Imag.*, 5-10.) The colouring was confined to the lips, the eyes, the hair, the drapery, and the ornaments of the dress; the hair was often gilded, as in the case of the Venus de' Medici, and in many statues glass eyes were inserted with eyelashes of copper, examples of which are still extant.

Alluding to this practice, Flaxman remarks, 'It seems to have been common to most countries, particularly in the early and barbarous states of society. But whether we look on the idols of the South Seas, the Etruscan painted sculpture and terra-cotta monuments, or the recumbent coloured statues on tombs of the middle ages, we shall generally find the practice has been employed to enforce superstition, or preserve an exact similitude of the deceased. These however are in themselves perverted purposes; the real ends of painting, sculpture, and all the other arts, are to elevate the mind to the contemplation of truth, to give the judgment a rational determination, and to represent such of our fellowmen as have been benefactors to society, not in the deplorable and fallen state of a lifeless and mouldering corpse, but in the full vigour of their faculties when living.'

For further information on this subject the following works may be consulted:—Kugler, *Ueber die Polychromie der griechischen Architectur und Sculptur und ihre Grenzen;* Semper, *Vorläufige Bemerkungen über bemalte Architectur und Plastik bei den Alten;* Quatremère de Quincy, *Le Jupiter Olympien;* and Stuart's *Antiquities of Athens.*)

PO'LYCHRUS, Cuvier's name for a genus of Saurians. [PLEURODONTS.]

PO'LYCLES. There were two sculptors or statuaries of Greece so called. They are noticed by Pliny and Pausanias, but in so undefined a manner that it is not always easy to distinguish which of the two artists is referred to. The first Polycles lived in the hundred and second Olympiad, or about 370 B.C., and was therefore contemporary with some of the greatest sculptors of antiquity, as Cephissodotus, Praxiteles, Leochares, and Lysippus. The second was flourishing in the hundred and fifty-fifth Olympiad, or about 170 years before our æra. He was the son of Timarchides, a statuary of Athens; but his master's name was Stadieus. (Paus., lib. vi., c. 4.)

The works of this Polycles and of his brother Dionysius were carried to Rome with other fine monuments of Greek art. Pliny (*Hist. Nat.*, xxxvi. 5) mentions that a statue of Juno, the joint production of these two sculptors, was placed in the temple of that goddess within the portico of Octavia; and near it was a statue of Jupiter, also the work of the two sons of Timarchides. Polycles has been supposed, from a passage in Pliny, to be the author of the original statue of the Hermaphrodite from which the well known existing representations—especially that usually called the Borghese Hermaphrodite, from its having belonged to that collection, though it is now in the Louvre—are copies. Pliny (xxxiv. 8) says, *Polycles hermaphroditem nobilem fecit.* This Polycles, the pupil or scholar of Stadieus, according to Pausanias (lib. vi., 4), made a statue of Amyntas, a pancratiast, or conqueror in the games, which was preserved at Olympia. Some statues of the Muses were also executed by Polycles. Polycles left sons who followed their father's profession.

POLYCLE'TUS, one of the most celebrated statuaries of antient Greece.

This name has given rise to much discussion from the difficulty that exists in determining how many artists were so called, and what works each produced. Pausanias (lib. vi., 6), speaking of a statue of a youth, says it was the work of Polycletus the Argive; but, he adds, 'not he who made the statue of Juno.' From this it seems clear that there were at least two Polycleti, and that both were natives of or connected with Argos; it may also be assumed that they were living nearly at the same time. Pliny (*Hist. Nat.*, xxxiv. 8) alludes to a Polycletus Sicyonius, attributing to *him* the works which gained for their author the reputation of one of the greatest artists of antiquity. The above, added to the statement of Pausanias, leads to the conclusion either that there were three sculptors of the name, two Argives and one a Sicyonian, or, as is most probably the case, that there were but two, and that the Sicyonian, the more celebrated, was also called *Argivus*. The most important of his works, and more especially his 'Juno,' were at Argos, and it has been reasonably surmised that he may have been so far honoured by that people as to have the citizenship of Argos conferred upon him.

Polycletus the Sicyonian was the scholar of Ageladas of Argos; and lived about the eighty-fourth Olympiad—an epoch illustrated by the talents of Ageladas, Myron, Phidias, Alcamenes, and the brightest names in the annals of art. There is an extensive list of the various admirable productions of Polycletus. Some of these are unquestionably to be attributed to the so-called Sicyonian; some may be of the second Polycletus, but, for the reasons before stated, it is not easy to appropriate them with any certainty. Among the chief works of Polycletus may be mentioned the colossal statue of Juno which decorated the temple of that goddess at Argos, and which was considered in many respects to equal the finest productions of his contemporary and rival Phidias. It was chryselephantine, or composed of gold and ivory: all the naked parts being of ivory, while the precious metal was employed for the drapery and accessories. The dimensions of this statue were less than those of the Olympian Jupiter which Phidias executed for the people of Elis, and of the Minerva of the Parthenon. The goddess was represented seated on her throne. In one hand she held a sceptre; in the other a pomegranate. The accompaniments and ornaments, having reference to mythological subjects, were of the richest description and most elaborate workmanship. This, taking it altogether, was considered the greatest work of Polycletus, but he was hardly less celebrated for others of a less ambitious character. Amongst these were two statues of young men, one, called 'Diadumenos,' fastening a band round his head, which was treated in a soft or delicate manner, 'molliter;' the other, 'Doryphorus,' of a more manly character, 'viriliter,' carrying a lance. A group of two naked boys called 'Astragalizontes,' playing at a game called Tali (with bones), is also celebrated; also some statues of Canephoræ (female figures carrying baskets on their heads), an Amazon, as well as several statues of Athletes (conquerors in the public games), and others. The Canephoræ were so much admired, that Cicero declares (*in Verr.*, iv.) that strangers at Messene crowded to see them, 'and the house in which they were preserved was less its master's than the ornament or attraction of the whole city.' The estimation in which another of his works, the *Diadumenos*, was held, may be conceived from the statement of Pliny, that it was 'centum talentis nobilitatum,' valued at one hundred talents. But of all the productions of this great master none has a greater claim to notice than that which, for its excellence, was called the *Canon*, or rule of art. This was a statue so perfect in its proportions that artists referred to it, and were bound by it as by a kind of law. 'Lineamenta artis,' says Pliny (xxxiv. 8), 'ex eo petentes, velut à lege quâdam.' Some have supposed that this figure was the Doryphorus; and the reason for this belief—and it is not without its force—is derived from a story recorded of the celebrated Lysippus, who, being asked from what master he had learned his art, replied, 'the Doryphorus of Polycletus.' On the other hand, the manner in which Pliny expresses himself respecting the 'Canon,' would warrant the assumption that it may have been some work distinct from the Doryphorus: In some copies we read 'idem et Doryphorum viriliter puerum fecit, et quem Canona artifices vocant;' another edition gives the passage thus: 'Diadumenum fecit molliter juvenem . . . . ; idem et Doryphorum viriliter puerum. Fecit et quem Canona,' &c.; showing at least that a difference of opinion has existed on the subject. It may fairly be questioned how far any single or particular work can properly be a *canon of art*—a rule by which works of different qualities and characters can be successfully executed; and it seems much more probable that the canon of Polycletus, whether or not it was the Doryphorus, was only a standard of excellence for works of its own particular character. We think this is the interpretation that must be given to it by all practical artists.

It is the highest praise to Polycletus to say he was a worthy competitor and rival of Phidias. On one occasion, when five of the most eminent artists of the day, Phidias being of the number, executed five statues in competition, that of Polycletus was preferred. It is also said that he carried to perfection the *Toreutic art* which Phidias had, as it were, commenced. Polycletus is declared by Pliny to have succeeded *only* (or perhaps it should be read *best*) in statues of a soft or gentle character. He also says that he first made figures resting on one leg. On the authority of Varro he also acquaints us that he preserved a certain squareness in some of his works, and that they were all made according to one model or *exemplar*. With respect to the former part of this charge, that of squareness (*quadrata*), it is likely that the style which characterised art immediately before what has been termed the Phidian period, may still have been partially continued, and, as Polycletus was one of the scholars of the hard and dry school, it is natural that some of his works may have shown evidence of the age of Ageladas; but that he had much improved upon the character of the earlier art, is proved by the opinion which Cicero has recorded of the state of style about the æra of Polycletus: 'Quis non intelligit Canachi signa rigidiora esse quam ut imitentur veritatem? Calamidis dura illa quidem, sed tamen molliora quam Canachi;

nondum Myronis satis ad veritatem adducta . . . . . . Pulchriora tamen Polycleti et jam planè perfecta,' &c. (Cic., *De Clar. Orat*, c. 18.) It may be observed here that Myron and Polycletus were always considered rivals. Pliny says, 'æmulatio etiam in materiâ fuit;' for one used the bronze of Ægina and the other always employed that of Delos for their works. The judgment of antiquity has given to Polycletus the reputation of one of the most remarkable artists of his extraordinary age. Our notice of him has necessarily been much compressed, but a fair estimate of the honour in which he was held as a great master of his art may be made not only from the recorded opinions of writers, but from the statement that among his scholars were Pericletus, Canachus (the second), Asopodorus, Alexis, Aristides, Phryno, Dino, Athenodorus, and Demeas. (Plin., *Hist. Nat.*, xxxiv. 8.) Unfortunately no work known to be the production of Polycletus exists by which the moderns can judge of the merit of this artist.

In addition to his fame as a statuary, Polycletus has that of an able architect. One of the monuments of his skill in this art was a marble building erected at Epidaurus, called the Tholus. Another was a theatre, erected within the precincts of the temple of Æsculapius, also at Epidaurus. It was considered, according to Pausanias, superior, for its symmetry and beauty, to any theatre extant.

The second Polycletus (Argivus) was the brother and scholar of Naucydes. It is thought likely that this artist was the author of two celebrated statues described by Pausanias; namely, the Jupiter Philius, erected at Megalopolis, and the Jupiter Milichius, a marble statue at Argos (Paus., lib. viii., 31, and ii., 20); as well as of some bronze tripods dedicated at Amyclæ. For further particulars respecting Polycletus, and works produced by artists so called, the reader is referred to Pliny (*Hist. Nat.*), Pausanias, Junius, and Sillig (*Catal. Artificum*), Em. David, and other writers on antient art.

An antient Greek epigram alludes to Polycletus, a Thasian; but there is no account of him among the artists of antiquity.

POLYCOTYLEDONOUS plants are those which have more than two cotyledons. Instances of this occur in the Brassicaceous order, in Lepidium and Schizopetalum; in the Boraginaceous order, in the genus Amsinkia, and especially in Coniferous plants. They are however regarded as analogous, in the latter case, to verticillate leaves, as compared with those which are opposite; and in the other instances they may be produced, by the division of the ordinary cotyledons into two or more lobes each. All such plants are referred to the Dicotyledonous type.

POLY'CRATES. [Samos]

POLYDECTUS, the name given by M. Milne Edwards to a genus of small *Brachyurous Crustaceans*, placed by him in his tribe *Corystians*, which tribe, in his opinion, forms the passage between the *Cancerians* and *Calappians* on one side and the *Anurous Decapods* on the other. He places *Polydectus* between *Thia* and *Corystes*. [Corystes, vol. viii.] Example, *Polydectus cupuliferus* (*Pilumnus cupuliferus*, Latr.).

POLYDONTES, De Montfort's name for a genus of *Helicidæ*. The shape of the shell resembles Carocolla, and the nearly circular aperture is surrounded with obtuse tubercular teeth. Mr. Swainson makes it a subgenus of *Lucernella*, Sw., and places it in his second subfamily *Lucerninæ*. (*Treatise on Malacology*.) Example, *Polydontes Imperator*.

POLYDORE VIRGIL. [Virgil.]

POLY'GALA SE'NEGA (*Virginian Snake-Root*), a perennial plant, native of several parts of North America, but the best is found in Virginia, having a rootstock, about the thickness of a quill, twisted, and generally branched, the rootlets being esteemed the most powerful part. The bark is of a dirty yellow colour; the odour disagreeable; the taste, at first, mucilaginous, then sweet, then acid, but at last acrid, causing an unpleasant feeling of permanent irritation in the throat. The powder of the root causes sneezing: it contains two sorts of resin, a very bitter principle (polygalin), and the acrid principle (senegin, which, when isolated, is insoluble in water, but perfectly so when in its natural state of combination with the extractive matter of the root), isolusin, and polygalate of iron and potassa, &c. It possesses very manifest stimulating and tonic powers, especially over all secreting organs, whether the skin, mucous membranes, or glands. By its irritating qualities it can act as an emetic, but it is rarely used except in croup. In some forms of indigestion, attended with inadequate secretion of saliva, it is extremely useful, but it is permanently serviceable in the chronic ophthalmia of strumous children, as it promotes increased action of the glands. As a gargle, it is an efficacious remedy against the hoarseness occasioned by common colds.

POLYGALA'CEÆ are polypetalous plants, with irregular flowers, a definite number of hypogynous stamens, arranged in two parcels; anthers opening by pores, and a simple superior ovary, becoming, when ripe, a drupe or capsule. In all Polygalaceæ proper the corolla is irregular, and composed of petals irregularly consolidated into the form of a keel, while the calyx has two of its lobes much larger than the others, and coloured like petals. The order consists of herbaceous plants or shrubs, in which bitter qualities are predominant; many of the species are sufficiently beautiful to be cultivated as objects of ornament.

POLYGAMOUS plants are those which have male and hermaphrodite, or female and hermaphrodite, or both female, male, and hermaphrodite flowers on the same or different individuals.

POLY'GAMY is the name of the custom according to which a man may have more than one lawful wife at a time, which custom prevails in several countries. Polygamy has existed in Asia from time immemorial, under the old religions, and Mohammedanism adopted and confirmed the custom. Montesquieu pretends that polygamy in the East is the consequence of the greater number of female births in that country; but this surmise is by no means proved. Another and a more plausible reason may be found in the premature old age of the female sex in some countries. Niebuhr, in his 'Travels in Arabia,' gives a curious conversation which he had with an Arab on the subject.

The Romans did not practise polygamy, nor did the Greeks. The barbarous nations, on the contrary, that is to say, those who were not Greeks or Romans, practised polygamy, with the exception of the Germans, 'who alone,' says Tacitus, 'among all the barbarians, are content with a single wife.' (*German.*, 17.)

In the scriptures we find instances of polygamy recorded before the flood. (*Genesis*, iv. 19.) It was common in the patriarchal times, and we have the instance of Jacob marrying two sisters. By the law of Moses it appears to have been tolerated. (*Exodus*, xxi. 9, 10, and *Deuteronomy*, xxi. 15.) But in the time of our Saviour, no indication appears of its being common among the Jews. Repudiation, or divorce, however, was frequent, and our Saviour (*Matthew*, xix. 9) reprobates the custom. St. Paul speaks always of marriage in terms implying the union of one man with one woman. In Christian countries, Polygamy has been long since universally forbidden, both by the church and by the civil law, under severe penalties, which in some countries amounted to death. In England, it is an offence punishable with transportation, or imprisonment for two years, for a married man or married woman to marry another person during the lifetime of the first wife or husband.

The Koran allows a man to have four legitimate wives; but it is only the rich who avail themselves of this permission. The Arabs are generally content with one wife.

Polygamy is different from modern concubinage, which is the cohabitation of man and woman unsanctioned by any legal ceremony or legal form.

POLYGA'STRICA, one of the two great divisions of Infusorial animalculæ proposed by Ehrenberg and adopted by many subsequent writers as a distinct class of the zoophytic division of the animal kingdom. In the 'Cyclopædia of Comparative Anatomy' (article 'Animal Kingdom'), the Polygastrica form the first and lowest of five groups of Cycloneurose animals. This appears to us the best view yet made public.

Enough has been said in the article Infusoria of the general results of M. Ehrenberg's long-continued and successful scrutiny of the minute organization of these animated atoms, we shall therefore here append an abstract of the classification which he has proposed, and which has been generally followed, except with regard to the substitution which he makes of Phytozoaria for Infusoria.

Class *Phytozoaria polygastrica*.

Swimming animals, without vertebræ, apodal, having sometimes a tail, and very often scattered vibratory or rotatory ciliæ; having no heart, but vessels extremely delicate (ténus), reticulated, transparent, and deprived of proper movement; often rudimentary eyes, with red pigmentum, indicating a nervous system, which however is not apparent; mouth nude or surrounded by vibratory ciliæ, and communicating with several ventricules; the phalanx apparent, and generally unarmed; no branchiæ; organs of generation filiform, reticulated, and granular; no distinct male organ; gifted with power of reproduction by spontaneous division.

Legion 1. Anentera.
Mouth communicating with several stomachal vesicules; no anus, no intestinal tube.

Order 1. Nuda.
Body without envelope.

Order 2. Loricata.
Body enveloped.

Section 1. Gymnica.
Body not ciliated; mouth with or without ciliæ; no pseudo-pediform prolongations.

§ 1. Gymnica nuda.
Fam. 1. Monadina.
Form of the body constant, reproduction by simple transverse division.
A. Without tail.
a. No eyes.
* Mouth truncate, terminal and turned forwards in swimming.
† Individuals solitary.
Genus *Monas*.
†† Individuals solitary when young, afterwards aggregated and again liberated.
Genus *Uvella*.
††† Individuals solitary when young, dividing crucially.
Genus *Polytoma*.
** Mouth direct, truncate, and turned different ways in the animal's movements.
Genus *Doxococcus*.
*** Mouth oblique, without edges, and bilobate.
Genus *Chilomonas*.
aa. One red eye.
Genus *Microglena*.
B. With a tail.
b. Body cylindrical.
Genus *Bodo*.
bb. Body angular.
Genus *Urocentrum*.
Fam. 2. Vibrionina.
Body elongate, constant in shape, dividing into many parts, mouth terminal?
A. Body filiform, cylindrical, bending itself in undulations.
Genus *Vibrio*.
B. Body filiform, rigid, and rolling itself in spiral.
b. The spiral plane.
Genus *Spirodiscus*.
bb. The spiral helical.
Genus *Spirillum*.
C. Body oblong, fusiform, or filiform, neither undulated nor turned spirally.
Genus *Bacterium*.
Fam. 3. Astasiæa.
Body elongated, becoming polymorphic by contraction, often cylindrical or fusiform, and spontaneously dividing itself in longitudinal or oblique direction.
A. No vestiges of eyes.
Genus *Astasia*.
B. Distinct rudimentary eyes.
b. One eye.
* A tail.
Genus *Euglena*.
** No tail.
Genus *Amblyophis*
bb. Two eyes.
Genus *Distigma*.

§ 1. Gymnica loricata.
Fam. 1. Cryptomonadina.
Envelope membranous, subglobular, and oval.
A. Simple.
a. No eyes.
* Mouth ciliated.
Genus *Cryptomonas*.
** Mouth nude.
Genus *Gyges*.
aa. With a red eye.
Genus *Lagenula*.
B. Compound, or reproducing by internal division.
Genus *Pandorina*.
Fam. 2. Closterina.
Envelope round, when rigid, separating spontaneously into two or four parts by transverse divisions, and open at each end.
Genus *Closterium*.

Section 2. Epitricha.
Body ciliated; mouth ciliated or nude; no pseudo-pediform prolongations.

Epitricha nuda.
Fam. 4. Cycladina.
A. Body with vibratory ciliæ.
a. Ciliæ in simple rows, longitudinal or circular.
Genus *Cyclidium*.
aa. Ciliæ scattered.
Genus *Pantotrichum*.
B. Body deprived of ciliæ, but furnished with hairs not vibratile.
Genus *Chætomonas*.

Epitricha loricata.
Fam. 3. Peridina.
A. Simple.
Genus *Peridinium*.
B. Compound, reproduced by interior division and rupture of the envelope.
b. No eyes.
* Envelope compressed.
Genus *Gonium*.
** Envelope globular.
† Ciliated.
Genus *Volvox*.
†† Tentaculated.
Genus *Sphærosira*.
bb. With eyes.
Genus *Eudorina*.

Section 3. Pseudopodia.
Body furnished with variable pseudo-pediform prolongations.

Pseudopodia nuda.
Fam. 5. Amæbæ.
Genus *Amæba*.

Pseudopodia loricata.
Fam. 4. Bacillaria.
The envelope dividing with the animal.
A. Free, never fixed.
a. Solitary or agglomerated.
* Envelope oblong.
Genus *Navicula*.
* Envelope wider than long
Gen. *Euastrum*.
aa. United in form of ribands, polymorphous: the individuals of the group have some freedom of movement without becoming detached; cuirass equally thick throughout, and prismatic.
Gen. *Bacillaria*.
aaa. United in bundles and not polymorphous, afterwards disunited.
Gen. *Fragillaria*.
aaaa. United in a fan shape, without foot: cuirass thicker in front.
Gen. *Exilaria*.
B. Fixed when young, afterwards free.
b. Sessile.
Gen. *Synedra*.
bb. Pedicellated, often dichotomous by ramification; body reduced below, cuneiform.
Gen. *Gomfonema*.
bbb. Pedicellated, often dichotomous; body contracted towards each extremity, subfusiform.
Gen. *Cocconema*.
bbbb. Pedicellated, united in a fan shape, and often dichotomous.
Gen. *Echinella*.
Fam. 5. Arcellina.
Envelope undivided.
A. Envelope urceolate.
Gen. *Difflugia*.
B. Envelope scutelliform.
Gen. *Arcella*.

Legion 2. Enterodela.

Mouth and anus distinct, opening into an intestine, round which are grouped the stomachal vesiculi.

Section 4. Anopisthia.

Mouth and anus contiguous.

Anopisthia nuda.

Fam. 6. *Vorticellina.*

A. Body pedicellated, fixed, afterwards detached, becoming often dichotomous.

a. Pedicle simple or branched, contracting into a spiral.

* Pedicle solid, the interior muscle indistinct.
Gen. *Vorticella.*

** Pedicle tubular, the interior muscle often distinct, becoming arborescent by the spontaneous divisions of the animal.

† Animalcula of the same group similar.
Gen. *Carchesium.*

†† Animalcula dissimilar in the same group.
Gen. *Zoocladium.*

aa. Pedicle not contracting in spiral, rigid, with no interior tube.
Gen. *Epistylis.*

B. Body not pedicellated and free.

b. Ciliæ in a single crown.
Gen. *Trichodina.*

bb. Ciliæ in a spiral row conducting to the mouth.
Gen. *Stentor.*

Anopisthia loricata.

Fam. 6. Ophridina.

A. Body surrounded by gelatine and not pedicellated.
Gen. *Ophrydium.*

B. Body enclosed in a membranous sheath.

b. Pedicellated.

* Sheath sessile.
Gen. *Tintinnus.*

** Sheath pedicellated.
Gen. *Cothurnia.*

bb. Not pedicellated.
Gen. *Vaginicola.*

Section 5. Enantiotreta.

Mouth and anus terminal and opposite, reproduction effected by transverse division.

Enantiotreta nuda.

Fam. 7. Enchelia.

A. Mouth, terminal, direct, obtuse, generally ciliated; division of the body transverse.

a. Body not ciliated, nor with hairs.

* Simple.
Gen. *Enchelys.*

** Double.
Gen. *Disoma.*

aa. Body with vibratory ciliæ.
Gen. *Holophrya.*

aaa. Body with ciliæ not vibratory.

* Subglobular.
Gen. *Actinophrys.*

** Disciform.
Gen. *Trichodiscus.*

B Mouth terminal, oblique, often ciliated.

b. Body without cilia.

* No prolongation of the anterior part.
Gen. *Trichoda.*

** Anterior part prolonged into the form of head and neck.
Gen. *Lachrymaria.*

bb Body ciliated.
Gen. *Leucophrys.*

Enantiotreta loricata.

Fam. 7. Colepina.

Envelope oval or cylindrical.
Gen. *Coleps.*

Section 6. Allotreta.

Mouth and anus terminal and opposite, reproduction effected by longitudinal and transverse divisions.

Allotreta nuda.

Fam. 8. Trachelina.

Mouth inferior, anus terminal.

A. Mouth unarmed.

a. No circle of ciliæ in front.

* Upper lip or front elongate, cylindrical or depressed, prolonged into a narrow trumpet form
Gen. *Trachelius.*

** Upper lip short, depressed, and dilated obliquely.
Gen. *Loxodes.*

*** Upper lip compressed, subcarinate, or tumid.
Gen. *Bursaria.*

aa. Front with a ring of ciliæ.
Gen. *Phialina.*

B. Mouth armed with hooks.
Gen. *Glaucoma.*

Fam. 9. Ophryocercina.

Anus inferior, mouth terminal.
Gen. *Ophryocercus.*

Allotreta loricata.

Fam. 8. Aspidiscina.

Gen. Aspidiscia.

Section 7. Katotreta.

Mouth and anus not terminal, reproduction as in the preceding section.

Katotreta nuda.

Fam. 10. Kolpoda.

Body smooth or ciliated, unarmed.

A. No eyes.

a. A short retractile proboscis.

* Body partially ciliated.
Gen. *Kolpoda.*

** Body ciliated obliquely all over.
Gen. *Paramæcium.*

aa. No proboscis.

* Front and tail contracted.
Gen. *Amphileptus.*

** Front oblong, tail contracted.
Gen. *Uroleptus.*

B. With eyes.
Gen. *Ophryoglena.*

Fam. 11. Oxytrichina.

Body ciliated and hairy, or armed with styles or straight spiaclæ and hooks.

A. Body hairy, no styles or hooks.
Gen. *Oxytricha.*

B. Body with hooks and no styles.
Gen. *Kerona.*

C. Body with styles and no hooks.
Gen. *Urostyla.*

B. Body with styles and hooks.
Gen. *Stylonichia.*

Katotreta loricata.

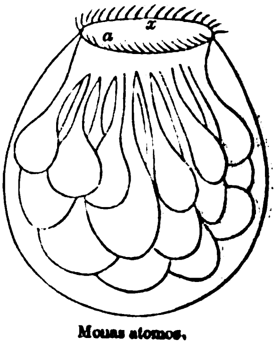
Fam. 9. Euplota.

Body armed with hooks.

A. Head indistinct.
Gen. *Euplotes.*

B. Head separated from the body by a contraction.
Gen. *Discocephalus.*

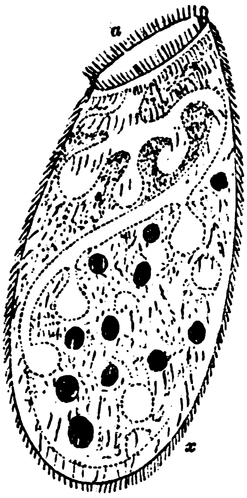
Fig. 1.



Monas atomos.

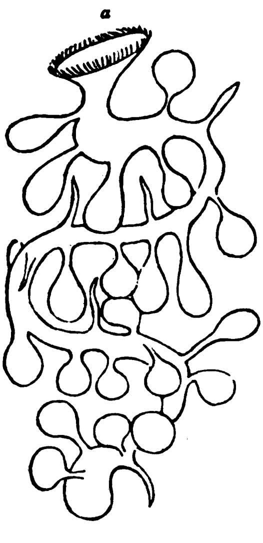
In illustration of these minute animals, we subjoin figures of Monas atomos as an example of the gastric structure of the Anentera, and of Leucophrys patula as an example of the Enterodela. The intestinal system of Leucophrys is also given separately. *a* in each case marks the situation of the mouth, and *x* that of the anus.

Fig. 2.



Leucophrys patula, with some of the gastric cavities full of food.

Fig. 3.



Intestinal system of Leucophrys patula.

PO'LYGLOTTS (πολύγλωττα, from πολὺς, much, many, and γλῶττα, a tongue), books in several languages. The application of the word is restricted to the Bible, which being a collection of books written by various persons, at various times, and on various subjects, is called Biblia (books), and a Polyglott Bible is therefore called Biblia Polyglotta.

The idea of a Polyglott Bible seems to have been first conceived in the third century, by Origen, who spent many years of immense labour in forming the Old Testament into such a work. This is commonly called Biblia Hexapla, the Bible in six columns. The six columns consisted of 1, the Hebrew text; 2, the Hebrew in Greek characters; 3, the Greek version of Aquila; 4, the Greek version of Symmachus; 5, the Septuagint; 6, the Greek version of Theodotion. These six columns went through the work; but some portions were in eight columns and others in nine, and with reference to these portions it is called Octapla and Enneapla. Considered apart from the Hebrew, and the Hebrew in Greek characters, it is called Tetrapla, the Bible in four columns. Though two languages only were used in the formation of this work, it might not improperly be called a Polyglott. It is to be lamented that, except in the Septuagint, only a few fragments of Origen's performance have come down to us. These were published by Montfaucon, in 2 vols. folio, Paris, 1714, under the title 'Hexaplorum Originis quae supersunt.'

Among the moderns, Aldus Manutius first planned a Polyglott in Hebrew, Greek, and Latin; but he never printed more than one sheet, a copy of which, supposed to be the only one in existence, is in the royal library at Paris. Its date is 1501. Since that time various Polyglotts have been published, of which the principal are the following:

I. The Complutensian Polyglott. This was printed at Complutum, the Latin name of Alcala de Henares in Spain. It was begun in 1502, and finished in 1517, but it was not published before 1522. It was patronised by Cardinal Francis Ximenes [CISNEROS], who employed seven learned men competent for the undertaking, and who munificently defrayed the entire expenses of its publication. This noble work was dedicated by its patron to Pope Leo X. It is in six volumes, folio. In the Old Testament each page consists of three columns, the left-hand page presenting the Hebrew, the Vulgate, and the Septuagint, and the right-hand the Septuagint, the Vulgate, and the Hebrew, with Hebrew primitives in the outer margin, and a supralineary Latin interpretation of the Septuagint. At the lower part of the page is a Chaldee paraphrase with a Latin interpretation, in two columns. In the New Testament each page has two columns, consisting of the Greek text and the Latin Vulgate with marginal references. The Greek Testament of this Polyglott is remarkable as being the first complete edition ever printed. Besides a variety of prefatory matter in the first volume, the whole of the sixth volume, with the concluding part of the fifth, consists of several distinct performances, making a large apparatus of elementary biblical literature. Of the Complutensian Polyglott 600 copies only were printed, and one is seldom met with except occasionally in public libraries.

II. The Antwerp Polyglott. This was printed by Christopher Plantin, at Antwerp, 1569-1572, in eight vols. folio. The editor was Arias Montanus, who had about sixty assistants. The work was published under the sanction of Philip II., king of Spain, who is reported to have defrayed its expenses, though some are of opinion that he merely lent the money to Plantin, and demanded its repayment in such a manner as to involve him in very great distress. The whole of the Complutensian Polyglott is comprised in this of Antwerp, besides another Chaldee paraphrase of a part of the Old Testament, a Syriac version of the New Testament, and the Latin translation of Santes Pagninus, altered by the editor, Arias Montanus. The Old Testament is in four columns, two in each page, a Latin interpretation of the Septuagint forming one of the columns, with a Chaldee paraphrase on the lower part of the left-hand page, and a Latin interpretation on that of the right. In the New Testament the versions are similarly arranged, Syriac being in place of the Hebrew, and the Latin of Pagninus answering to the Latin interpretation of the Septuagint. The types are bold and finely formed, and the paper is of a yellowish cast and of excellent quality. The sixth, seventh, and eighth volumes consist of lexicons, grammars, and other aids for understanding the contents of the preceding volumes. Of this Polyglott 500 copies only were printed, and the greater number of these were lost in being conveyed by sea to Spain, so that it is more rare than even its predecessor of Complutum.

III. The Parisian Polyglott. This was printed at Paris, by Antony Vitré, 1628-1645, in 10 vols. large folio. The editor was Guido Michael le Jay, who at this time was a layman, but afterwards became an ecclesiastic. He had several learned associates, and he might have had the patronage of Cardinal Richelieu, but, refusing this favour and venturing to publish the work at his own expense, he brought ruin upon himself. This splendid performance contains all that is in the two preceding Polyglotts, with the addition of an Arabic version of the Old and New Testament, a Syriac version of the former, and the Samaritan Pentateuch. These additions however are made separately, so that, though the Parisian Polyglott contains portions of the Bible in seven languages, its pages do not exhibit at one view more than the Antwerp Polyglott. These ten volumes, in imperial folio, present attractions of no ordinary kind. The paper, though perhaps not so fine as that of the Antwerp Polyglott, is beautiful; the types are large, clear, and elegantly formed; the engraver's art moreover is appropriately displayed in furnishing occasional embellishments; in a word, the Parisian Polyglott is altogether as magnificent a work as can well be conceived.

IV. The London Polyglott. This was edited by the learned Brian Walton, who became afterwards bishop of Chester. It is in 6 vols., large folio. It was published by subscription, and the volumes came out in the following order:—the first volume in September, 1654; the second in July, 1655; the third in July, 1656; and the last three in 1657. 'And thus,' says Dr. Twells (*Life of Pocock*), 'in about four years was finished the English Polyglott Bible, the glory of that age, and of the English church and nation, a work vastly exceeding all former attempts of that kind, and that came so near perfection as to discourage all future ones.' Some portions of this Polyglott are printed in seven languages, all open at one view. No one book is given in nine languages; but nine languages are used in the course of the work, namely, Hebrew, Chaldee, Samaritan, Syriac, Arabic, Persian, Ethiopic, Greek, and Latin. A vast body of introductory matter is in the first volume, and the sixth is made up of various readings, critical remarks, &c. Brian Walton was assisted by a number of men who formed a constellation of oriental and general scholars, such as perhaps have appeared together at no other period during the whole history of our country. One of these men was Dr. Edmund Castell, who published his 'Lexicon Heptaglotton' in 1669, 2 vols. folio. This is a lexicon of the seven oriental languages occurring in Walton's Polyglott, and it has grammars of all these languages prefixed. It generally accompanies the Polyglott, which can hardly be pronounced complete without it. Walton's work is by no means equal in appearance to the three preceding Polyglotts, but in point of solid usefulness to the biblical scholar it is far beyond any one of them. The eight volumes form an extraordinary collection of aids for studying the original scriptures. As the London Polyglott is frequently found in private libraries, a more minute description of its contents appears to be unnecessary. Its history is recorded at length in Archdeacon Todd's 'Memoirs of the Life and Writings of the Right Rev. Brian Walton, D.D., lord bishop of Chester,' 2 vols. 8vo., London, 1821, a work which comprises also notices of all Walton's coadjutors.

V. Bagster's Polyglott. This work was published by the enterprising bookseller by whose name it is known, in 1 vol. folio, London, 1831. The Old Testament is in eight languages, and the New Testament in nine. Eight languages are exhibited at once upon opening the book. The languages are Hebrew, Greek, English, Latin, German, Italian, French, Spanish, and Syriac, the New Testament being given in the last language as an appendix. To these are added the Samaritan Pentateuch in Hebrew characters; the notes and readings of the Masorites; the chief variations of the Vatican text of the Septuagint (which is followed in this Polyglott), and of the Alexandrian as given by Grabe, Oxford; and of the Greek Testament the whole of the selected various readings given by Griesbach in his own edition of 1805. Prefixed to the work are fifty pages of prolegomena in Latin, by Professor Lee of Cambridge. The types are small, but clear and elegant, and the paper is of excellent quality. The whole volume presents a very handsome appearance.

On the subject of Polyglott Bibles in general, the reader will be gratified by consulting Horne's *Introduction*; Butler's *Horæ Biblicæ*; Clarke's *Bibliographical Dictionary*; Le Long's *Bibliotheca Sacra*, improved by Masch.

POLYGNO'TUS, one of the most celebrated of the antient painters. He was a native of Thasos: son and pupil of Aglaophon, a painter of that island. Pliny merely says that Polygnotus lived before the 90th Olympiad (xxxv. 9); but from Plutarch's account of his friendship for Cimon and love for Cimon's sister Elpinice (Plut., *Cim.*, c. iv.), it would seem probable that he flourished at Athens at least as early as the 80th Olympiad (B.C. 460). Thasos was reduced by the Athenians, after a war of three years, in 463 B.C., and it is likely enough that Polygnotus then left his native country, and accompanied its conqueror Cimon on his return to Athens. A story told by Plutarch (*Cim.*, c. xiv.) would represent Elpinice as no longer young in the year 463: if so, it is not probable that she would have retained sufficient beauty, at a later period, to be introduced by the artist into his painting in the Pœcile. Polygnotus obtained the rights of citizenship at Athens: how long he continued to paint we have no means of knowing. Pliny describes him as 'the first who painted women with transparent drapery, and covered their heads with variegated caps. He first began to open the mouth, and show the teeth of his figures, and to give them an expression of countenance different from the antient stiffness.' (Plin., xxxv. 9.) Polygnotus and Micon were the first artists who employed the 'sil,' or yellow colour found in the Attic silver mines. (Plin., xxxiii. 13.) The same painters used a black or blue colour prepared from grape husks ('tryginon'). (Plin. xxxv. 6.) Some of the works of Polygnotus were executed in the encaustic method. (Plin., xxxv. 11.) Cicero (*Brutus*, xviii.) mentions him as one of the masters who used the four old colours. [PAINTING.] Aristotle (*Polit.*, viii. 5) calls him ἠθικός, one who conveyed a notion of moral qualities and of character by his works, and in the 'Poetics' (15) he contrasts this ethic character of Polygnotus with the absence of such a quality in Zeuxis; in cap. 4 he says that Polygnotus made his figures superior, Pauson inferior, and Dionysius similar, to nature. It would follow from all this that Polygnotus held an analogous place in the history of antient art to that occupied by some of the early Florentine masters in modern painting. Perhaps Fra Angelico or Masaccio would be a fair parallel; always bearing in mind that painting among the antients was essentially statuesque in its character, and therefore, at an equivalent stage of development, the drawing of the figure would be much further advanced than in Italian art.

The principal works of Polygnotus enumerated by the antients are—

1. The pictures in the Lesche at Delphi, of which Pausanias (x. 25) has left an elaborate description. The subjects were—the Capture of Troy, the Return of the Greeks, and the νεκυία, or Visit of Ulysses to the Shades. It would seem, from the account of Pausanias, that names were attached to most of the figures, as we see them often inscribed on the vases. The variety of age and sex portrayed, and the feelings of some of the personages, imply a discrimination of character and a power of expression, such as we should expect from the reputation of the artist. Thus Hector was represented seated, clasping with his hands his left knee, and with an expression of deep melancholy. Penthesilea appeared to contemplate Paris with contempt and scorn (x. 31). Lucian (*Imag.*, 7) mentions the figure of Cassandra, as showing delicacy and beauty of the brow, and the blush of the cheek (ὀφρύων τὸ ἐπιπρεπὲς καὶ παρειῶν τὸ ὑπερευθές). A German artist, Riepenhausen, published some designs formed on the description by Pausanias of these works of Polygnotus, and Göthe (vol. xliv., 97) has written an essay on the subject.

2. The Pœcile at Athens. The subject probably was the Destruction of Troy. (Plut., *Cim.*, iv.)

3. A painting in a building near the Propylæa at Athens. (Paus., i. 22, 6.)

4. The Marriage of the Daughter of Leucippus in the temple of the Dioscuri at Athens. (Paus., i. 18, 1.) If this work were extant, a comparison of it with the noble picture of nearly the same subject by Rubens in the Munich gallery would probably afford as striking a contrast between antient and modern art as can be imagined.

5. It seems likely that Polygnotus painted the temple of Theseus, at least if we adopt the emendation ἐν τῷ Θησέως ἱερῷ, for ἐν τῷ Θησαυρῷ, in Harpocration.

6. A picture representing Ulysses after the Slaughter of the Suitors, in the temple of Minerva Area at Platæa. (Paus., ix. 4, 1.)

7. The Walls at Thespiæ, painted by Polygnotus and restored by Pausias. (Plin. xxxv. 11.)

It is very difficult for us to form any distinct idea of what the effect of the works of Polygnotus must have been. From the expressions used by Aristotle, they probably possessed much calm dignity and an absence of all exaggeration. We must not imagine that they showed the complicated composition, the masses of light and shade, the variety of colour, or the accurate perspective of the best modern masters. An attentive observation of the finest of these vases, which still retain traces of the severer style of the art united with good execution, will convey the best general notion of the works of such an artist. As in sculpture, no accessories probably appeared, except such as were absolutely necessary for understanding the story, and essential to the attitudes of the figures. (Sillig, *Catalogus Artificum*; Müller, *Handbuch der Archæologie und Kunst*; Müller, *De Vitæ et Operibus Phidiæ*; Goethe, vol. xliv., p. 97.)

POLYGON, REGULAR. [REGULAR FIGURES; REGULAR SOLIDS.]

PO'LYGON and **POLYHEDRON.** The word polygon means figure of several angles, and polyhedron means solid of several faces: the first is used for a plane bounded by straight lines, the second for a solid bounded by planes. We shall in this article state the general properties of both kinds of figures, reserving the particular consideration of those which have equal sides or equal faces for the articles REGULAR FIGURES and REGULAR SOLIDS.

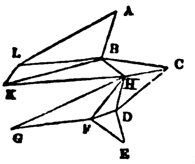
The elements of Euclid confine themselves to convex polygons, and to a limited number of polyhedrons. The most general propositions with respect to polygons as polygons, that is, which are true whatever the number of sides may be, are as follows: they are either in the 'Elements', or immediately deducible from them.

1. The internal angles of a polygon of n sides are together always equal to $n-2$ pairs of right angles. See REVOLUTION OR ROTATION for the full meaning of this proposition.

2. When a figure of an even number of sides is inscribed in a circle, the sum of the first, third, fifth, &c. angles is equal to the sum of the second, fourth, sixth, &c. angles. But when a figure of an even number of sides is *described* about a circle, for angles read sides in the preceding property.

3. Any one side of a polygon is less than the sum of all the others.

The first-mentioned theorem remains true beyond the limits of Euclid's meaning, namely, as long as the figure of n sides can in any way be divided into $n-2$ triangles: that is, in fact, as long as no side of the figure crosses any other side. Thus the adjoining polygon of 10 sides, being divisible into 8 triangles, has the sum of all its angles equal to 16 right angles, four of these angles being each greater than two right angles.



To make a rule however which shall connect the angles of any polygon whatsoever, that is, of any figure, however irregular, in which a point returns by a succession of straight lines to the point from whence it set out, would be difficult in the ordinary way of measuring angles. On this subject see SIGN.

A polygon of n sides or edges has one face, and n angular points or corners: that is, the number of faces and corners together exceed the number of edges by 1. On one side of the polygon let another polygon be described: it is then obvious that the two polygons have two corners in common, but only one edge, or else three corners and two edges, &c.; that is, whatever *new* corners are added, one more new edge is added: or, since one face is added, the total number of faces and corners is increased by the same as the number of edges. The same may be proved of every new polygon which has one or more sides in common with any of the old ones: and since at the outset the number of corners and faces exceeds the number of edges by 1, and since every alteration adds the same to both sides of this equation, it remains true throughout. Whence the following theorem: let any number of polygons, in the same plane or not, be so connected that each has one side or more in common with one or more of the others: call each polygon one face; each side, to how many polygons soever it may belong, one edge; and such angular point, no matter how many angles may be collected there, one corner: the number of faces and corners will always exceed the number of edges by one.

Let there be a solid polyhedron, and beginning from one given face, annex the others successively: the preceding theorem will remain true, as long as each face which is added adds one or more new edges. But it is obvious that when the polyhedron is completely finished, with the exception of the last face, the completion of the solid, by counting the last face, adds no new edge or edges, these having been completely laid down in former faces. Hence,[*] in every solid polyhedron, the number of faces and corners exceeds the number of edges by *two*.

Again, on a given face of a polyhedron as a base, let a second polyhedron be constructed, and on a given face of that a third, and so on, it being permitted to include several faces from different polyhedrons among the faces of the new one. In the part of each new polyhedron which belongs to the preceding ones, as already shown, the corners and faces exceed the number of edges by one; and the same also in the new portion. But since one new polyhedron is added at every step, it follows that the new faces and corners are the same in number as the new edges and polyhedron. But at the beginning, counting one polyhedron, the faces and corners outnumber the edges and polyhedron by one (since they outnumber the edges by 2): and since both sides of this equation receive the same accession for every new polyhedron, it remains always true: that is, the total number of corners and faces in any system of polyhedrons, each of which has one or more faces in common with others, exceeds the total number of edges and polyhedrons by 1.

In every face of a polyhedron take any point, which for abbreviation we may call the centre of that face. Join the centre of each face with the centres of the adjoining faces; we have thus a new polyhedron, and the points may be so taken, that those lying in the faces which meet at any corner, shall all be in the same plane. The new polyhedron has obviously as many corners as the old one had faces; and as many faces as the old one has corners: the number of edges being the same in both: and if we call a corner triangular, quadrangular, &c., according as three, four, &c. angles meet there, the new solid has as many triangular, &c. faces, as the old solid has triangular &c. corners; and vice versâ. These polyhedrons may be called conjugate to one another.

Thus there is a triangular tetrahedron (four-faced solid) with four triangular corners: consequently the conjugate solid is another tetrahedron of the same kind. The quadrangular hexahedron (of six four-sided faces) has 8 triangular corners: the conjugate solid has therefore 8 triangular faces, and six quadrangular corners (the triangular octahedron). The pentagonal dodecahedron (having 12 five-sided faces) has 20 triangular corners: the conjugate solid has therefore 20 triangular faces and 12 pentagonal corners (the triangular icosahedron). The solids mentioned in this paragraph are those which may be made of equilateral and equiangular faces. [REGULAR SOLIDS.]

Again, a solid can be formed with 14 quadrangular faces, having 8 triangular corners and 8 quadrangular ones: its conjugate solid has therefore 8 triangular and 8 quadrangular faces, with 14 quadrangular corners; the number of edges in both being $8+8+14-2$, or 28.

Let F_3, F_4, F_5, &c. be the number of triangular, quadrangular, pentagonal, &c. faces in a solid, and C_3, C_4, C_5, &c., the number of triangular, quadrangular, pentagonal, &c. corners. Let F, C, E be the total number of faces, corners, and edges; then we have

$$F = F_3 + F_4 + F_5 + \ldots\ldots \quad (1)$$
$$C = C_3 + C + C_5 + \ldots\ldots \quad (2)$$

Again, since $3F_3 + 4F_4 + \ldots\ldots$ is the total number of sides of all the faces, before they are joined, and since the junction joins each with another, we have half the preceding for the number of edges, or

$$2E = 3F_3 + 4F_4 + 5F_5 + \ldots \quad (3)$$
$$2E = 3C_3 + 4C_4 + 5C_5 + \ldots \quad (4)$$

But $F + C = E + 2$, whence we deduce

$$2C = 4 + F_3 + 2F_4 + 3F_5 + \ldots \quad (5)$$
$$2F = 4 + C_3 + 2C_4 + 3C_5 + \ldots \quad (6)$$

Hence $F_3 + F_5 + \ldots\ldots$ and $C_3 + C_5 + \ldots\ldots$ must be even numbers; for if these be subtracted from the even numbers 2 C and 2 F, it will be seen that even numbers are left: or the number of odd-sided figures must be even, and also the number of odd-angled corners. Moreover the number of corners must be made up of (1) a couple; (2) half as many as there are odd-sided faces; (3) 1 for every quadrangle, 2 for every hexagon, 3 for every octagon, &c.; and the same will be true if we write faces for corners, and corners for faces.

Since every face has at least three sides, and every corner at least three angles, 2 E cannot fall short of 3 F, nor of 3 C. Hence, neither $4E - 6F$, nor $4E - 6C$ can be negative, that is, neither of the following can be negative:

$$3C_3 + 2C_4 + C_5 - 12 - C_7 - 2C_8 - 3C_9 - \ldots\ldots \quad (7)$$
$$3F_3 + 2F_4 + F_5 - 12 - F_7 - 2F_8 - 2F_9 - \ldots\ldots \quad (8)$$

Hence it appears that there must be either triangular, quadrangular, or pentagonal faces, and either three-angled, four-angled, or five-angled corners. Call these the *essential* faces and corners. Hence the following readily follows:

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[*] The present mode of demonstrating this well known theorem was given, for the first time to his knowledge, by the author of this article, in the *Phil. Mag.*; but he has since found that it is substantially contained (under mathematical symbols which rather conceal its simplicity) in a memoir by M. Cauchy, in the 'Journal de l'Ecole Polytecnique.'

If the essential faces be all triangles, there must be 4 at least; if all quadrangles, 6 at least; if all pentagons, 12 at least: and the same of the corners. If the non-essential faces be all hexagons, or the non-essential corners six-angled, it would appear* that the minimum number of essential faces and corners need not be increased, how many hexagons soever, or six-angled corners, there may be.

If all the corners be three-angled, we have $2E = 3C$, or (8) vanishes. If then all the faces be of sides not exceeding six, we have

$$3F_3 + 2F_4 + F_5 = 12.$$

Similarly, if all the faces be triangular, and the corners nowhere more than six-angled, we must have

$$3C_3 + 2C_4 + C_5 = 12.$$

Hence it follows that when all the corners are three-angled, and all the faces either pentagons or hexagons, the number of pentagons can be neither more nor less than 12: also that when all the faces are triangles, and all the corners five angled or six-angled, the number of five-angled corners can be neither more nor less than 12.

If all the corners be four-angled, we have $2E = 4C$, or

$$F_3 = 8 + F_5 + 2F_6 + \ldots..$$

whence there must be at least 8 triangles. And similarly, if all the sides be quadrangular, there must be at least 8 three-angled corners.

If all the corners be five-angled, we have $2E = 5C$, or

$$F_3 = 20 + 2F_4 + 5F_5 + 8F_6 + \ldots.$$

so that there must be at least 20 triangular faces. Similarly if all the faces be pentagonal, there must be at least 20 three-angled corners.

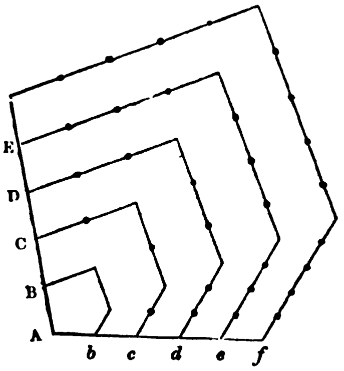
Some of the most obvious ways in which figures may be put together so as to enclose space are as follows:—

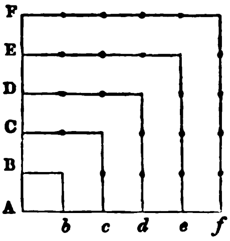
1. Two n-sided faces, joined by n quadrangles. This includes the prism and truncated pyramid, and also every quadrangular hexahedron.
2. The pyramid, with one n-sided face and n triangles.
3. The solid with n quadrangles, and $2n$ triangles, the symmetrical case of which is a prism surmounted at each end by a pyramid.
4. Two faces of n sides, and mn quadrangles, m being any whole number.
5. Twelve quadrangles so arranged that four of them are placed corner to corner, the figure being finished by four others on each side. When the quadrangles are all equilateral, this is the rhombic dodecahedron.
6. The pentagonal dodecahedron, in which there are two pentagons, each of which has another pentagon on every side, the two figures being placed together so that the projecting angles of the one fill up the re-entering angles of the other.
7. The triangular icosahedron, the conjugate solid of the last, which may be thus imagined. Let a pentagonal prism be surmounted at each extremity by a pyramid, and let the sides of the prism which join the angles of the opposite pentagons, and also a diagonal in each quadrangle, be supposed to be formed of extensible and contractible threads. Turn one of the surmounting pyramids partly round: then the sides and diagonals of the five quadrangles will no longer continue in the same plane, but will form ten triangles, which, with the ten belonging to the pyramids, complete the number required.

When the sides of a polygon are given, the polygon itself is not given, unless it be a triangle: thus there is an infinite number of quadrangles which have the same four sides. But it is very remarkable that when a solid is formed of given faces, in a given order of juxtaposition, those faces, if they form a solid at all, can only form one. This is the reason of the stability of solid figures; were it not for this, a box, for example, would require internal cross-pieces to support the sides. This remarkable property is assumed by Euclid as a part of a definition, and that improperly; since it is a new axiom.

A proof of the axiom implied in the above was given by M. Cauchy in the article already cited, and will be found in the notes to Legendre's Geometry. It is sufficient, but depends on considerations foreign to the subject as usually considered.

For the remarkable division of equal solids into symmetrically and unsymmetrically equal see **Symmetrical**: for the more general view of the nature of polygons, suggested by modern geometry, see **Transversal**: see also **Triangle**, **Regular Figures** and **Regular Solids**, **Trigonometry**, &c.





To explain the meaning of the term polygonal number [**Numbers, Appellations of**], let us take as an instance the pentagonal number. Take any pentagon BA*b*, and construct a set of pentagons, AC*c*, AD*d*, &c., double, treble, &c. of AB*b* in linear dimension. Divide the sides of each pentagon into parts, each equal to the corresponding side of AB*b*. Then if we begin with A, which is one point, and afterwards take in all the points of the first pentagon, we have 1+4, or 5 points. If we now add all the additional points of the second pentagon (including subdivision-points), we have 1+4+7 or 12 points. Take in the next pentagon, and we have 1+4+7+10, or 22 points. Hence the series 1, 5, 12, 22, &c. is called the series of pentagonal numbers; and a set of numbers is thus pointed out which may be as justly called pentagonal as the set 1, 4, 9, &c. may be called square. It must be supposed that the various sets of polygonal numbers were suggested by the square numbers.

POLYGONAL NUMBERS. [**Numbers, Appellations of.**]

POLYGONA'CEÆ are apetalous plants with triangular fruit and usually with stipules united into a tube or ocrea, through which the stem passes. Their fruit is evidently composed of three aspermous carpellary leaves joined by their edges, and surrounding a single erect ovule deriving its origin from a central placenta; and it proves in a striking manner the truth of the modern theory, that in many cases the ovules derive their origin immediately from the centre of vegetation, or the growing point, and not from the margin of carpellary leaves. The order consists of herbaceous plants more frequently than of shrubs, and a large part of them are mere weeds; as for example our docks, and wild polygonums; some however are handsome flowers, as the *Polygonum Orientale*, or Garden Persicaria, and *P. amplexicaule*; others are valuable for cooking, as the rhubarb, whose roots also furnish the important tonic and purgative drug of that name, and in some a great quantity of astringent matter is found, as in the *Coccoloba uvifera*, or seaside grape of Jamaica, from which a kind of Kino has been prepared. A species of Indian polygonum, called *tinctorium*, has recently been introduced into cultivation in Belgium as a substitute for indigo. The flour of the seeds of *Polygonum tataricum*, *fagopyrum*, and others, is made into a bad kind of bread in Lombardy and other countries.

POLY'GONUM (Zoology), Schumacher's name for a genus composed of those species of *Turbinellus* of authors with large continuous ribs, so that they look like shells with many angles or sides. Type, *Turbinellus polygonus*.

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* Remember however that this subject is very incompletely known; and though some necessary conditions can be laid down, it has never been found out what conditions are both necessary and sufficient in order that a given number of faces may enclose space.

POLY'GONUM BISTORTA (*Great Bistort*, or *Snakeweed*). Bistort is an indigenous perennial plant, growing in woods and meadows. The root, which is the officinal part, is about the thickness of a finger, round or flattish, and much twisted, like the coils of a snake, externally dark brown, within red and fleshy. When dried, it has no smell, but a very astringent taste. Roots of plants a few years old should be taken up in spring or autumn. It consists chiefly of tannin, gallic acid, starch, and oxalate of lime. It was formerly given in diseases of debility accompanied with sanguineous or mucous discharges, and likewise fevers, especially intermittents, for the cure of which it may be combined with gentian, or sweet flag-root. It is to be regretted that an indigenous remedy of such power has fallen into neglect.

POLYGY'RA, a genus of *Helicidæ* with the shell completely discoid; no pillar; the aperture angulated and margined, and a small tooth on the inner lip.

Mr. Swainson, whose description this is, makes *Polygyra* a subgenus of *Lucernella*. (*Treatise on Malacology*.)

Example, *Polygyra septemvolva* (Sow., 'Conch. Man.,' fig. 383).

POLYHALLITE, a mineral which occurs crystallized and massive. Primary form of the crystal a right rhombic prism. Fracture uneven. Hardness sufficient to scratch carbonate of lime. Colour brick-red, pale flesh-red, and yellowish. Lustre resinous. Opaque. Specific gravity 2·769.

In the flame of a candle it melts into an opaque globule; it is soluble in water, and the solution has a saline and bitter taste.

It is found at Salzburg and also at Ischel in Upper Austria.

Analysis by Stromeyer:—

Sulphate of lime	44·74
Sulphate of potash	27·70
Sulphate of magnesia	20·04
Chloride of sodium	0·19
Peroxide of iron	0·34
Water	5·95
	98·96

POLYHEDRON. [POLYGON AND POLYHEDRON.]

POLYHISTOR, ALEXANDER, a native of Cotyæum in Phrygia, according to some, and of Miletus according to others, was a geographer and historian, who lived in the seventh century of Rome, and was taken prisoner by the Romans in the war of Sulla against Mithridates. Being purchased by Cornelius Lentulus, he was entrusted by him with the education of his children, and at last received his freedom. He then assumed the name of Cornelius, after that of his patron. He resided chiefly at Rome, and had a country-house at Laurentum, which having taken fire while he was there, he perished in the flames. He is often mentioned and quoted by Pliny the Elder, Diogenes Laertius, Clemens Alexandrinus, and Eusebius, as a man of very extensive learning, in consequence of which he was styled Polyhistor. He wrote a work in forty books, each book being the description of a distinct country. Stephanus Byzantinus mentions his account of Bithynia, Caria, Paphlagonia, Syria, Libya, Creta, and other countries. Clemens Alexandrinus quotes his treatise on the Jews, of which Eusebius has inserted fragments in his 'Chronography.' Clemens Alexandrinus mentions another work of Polyhistor, on the 'Symbol of Pythagoras;' and Cyril of Alexandria, in his work against Julian, quotes his authority on the early history of the world. Unfortunately none of Polyhistor's works have come down to us.

Polyhistor is also the title of a work on geography by Solinus. [SOLINUS.]

POLY'LEPAS, M. de Blainville's name for the genus *Scalpellum* of authors. [CIRRIPEDA, vol. vii., p. 208.]

POLYMIGNITE, *Titaniate of Iron, Zircon*, &c. Occurs crystallized. Primary form a right rhombic prism. Fracture conchoidal. Hardness, scratches phosphate of lime, and is scratched by felspar. Colour black. Lustre nearly metallic. Opaque. Specific gravity 4·806.

Before the blow-pipe, infusible; acted upon by sulphuric acid, when reduced to fine powder.

It is found in imbedded crystals at Frederiksvärn in Norway.

Analysis by Berzelius:—

Titanic acid	49·3
Oxide of iron	12·2
Oxide of cerium	5·0
Oxide of manganese	2·7
Zirconia	14·4
Yttria	11·5
Lime	4·2
Magnesia, potash, silica, and oxide of tin	traces
	99·3

POLYMORPHI'NA. [FORAMINIFERA, vol. x., p. 348.]

POLYNE'MUS, a genus of fishes, placed by Cuvier in his third division of the Percidæ, the species of which are distinguished by the ventral fins being inserted farther back than the pectorals. These fishes are further distinguished by having several long filaments beneath the pectoral fin; these are, in fact, free rays of that fin: their teeth are minute and dense as the pile on velvet, or recurved like the teeth in a carding-machine; they are found on both jaws, as well as on the vomer and palate. The general form of the body of the *Polynemi* somewhat resembles that of the perch; the muzzle projects over the mouth; the eyes are rather large and placed very forward; the dorsal fins are short and widely separated, and the caudal fin is large, and more or less forked. The scales extend on the fins, as in many of the *Sciænidæ*, which these fishes appear to approach in some other characters.

Considerable interest is attached to the *Polynemi* on account of some recent discoveries, which tend to show that they produce isinglass in considerable abundance.

The attention of the members of the Zoological Society was first directed to this subject by Dr. Cantor.[*] 'In the December number (1838) of Parbury's "Oriental Herald,"' says this naturalist, 'appears a letter "on the Suleah fish of Bengal, and the isinglass it affords:"' this fish, says the anonymous writer, when at its full size, attains about four feet in length, and is squaliform, resembling the shark species in appearance, but exhibiting a more delicate structure. The meat of this fish is exceedingly coarse, and is converted by the natives, when salted and spiced, into 'burtah,' a piquant relish, well known at the breakfast-tables of Bengal. The bladder of the *Suleah* may be considered the most valuable part of it; this, when exposed to the sun and suffered to dry, becomes purely pellucid, and so hard, that it will repel the edge of a sharp knife when applied to it. These bladders vary from half a pound to three-quarters of a pound avoirdupois in weight when perfectly dry. This fish abounds in Channel Creek, off Saugor, and in the ostia, or mouths, of all the rivers which intersect the Sunderbuns, and are exceedingly plentiful in certain seasons.

The discovery of isinglass as a product of India was so important, that Dr. Cantor determined to investigate the subject, and to ascertain, if possible, what the Suleah might be; when, quite unexpectedly, he received a letter from Mr. McClelland, in which that naturalist stated that he had examined this fish, and found it to be the *Polynemus Sele* of Hamilton's 'Fishes of the Ganges:' he moreover discovered that an individual of that species weighing two pounds would yield sixty-five grains of pure isinglass, an article which in India sells at sixteen rupees (1*l.* 12*s.*) per pound.

Thinking it highly probable that other species of *Polynemus* besides the *P. Sele* will yield isinglass, Dr. Cantor proceeds to give a short account of those species which came under his observation while attached as surgeon to the Honourable Company's Survey of the sea-face of the Gangetic delta.

'The species best known,' says the author, 'is the *Polynemus Risua* of Hamilton (*Pol. longifilis*, Cuvier; the Tupsee, or Mango Fish, of the Anglo-Indians): this inhabits the Bay of Bengal and the æstuaries of the Ganges, but enters the mouths of the rivers even higher up than Calcutta during the breeding season (April and May), when the fish is considered in its highest perfection, and is generally sought as a great delicacy. This species is the smallest, for its length seldom exceeds eight or nine inches, and one and a half or two inches in depth.' It is remarkable for the great length of filaments, or free rays, of the pectoral fins, these being about twice the length of the body, and seven in number on each side. *Polynemus aureus* and *P. Topsui* of Hamilton, Dr. Cantor states, are closely allied to this species. '*Polynemus Sele*, Hamilton (*P. plebeius*, Broussonnais; *P. lineatus*, Lacépède), is the Suleah fish mentioned in Parbury's "Oriental Herald," the same which Mr. McClelland submitted to examination. This species, as well as another closely allied to *P. quadrifilis*,[*] Cuvier, which I have dissected, figured, and described, under the name of *P. Salliah* (Saccolih), appears to be equally plentiful, in shoals, all the year round, in the æstuaries of the Ganges, and is appreciated by Europeans for its excellent flavour: both species attain a size from three to four feet in length, and eight to ten inches in depth.'

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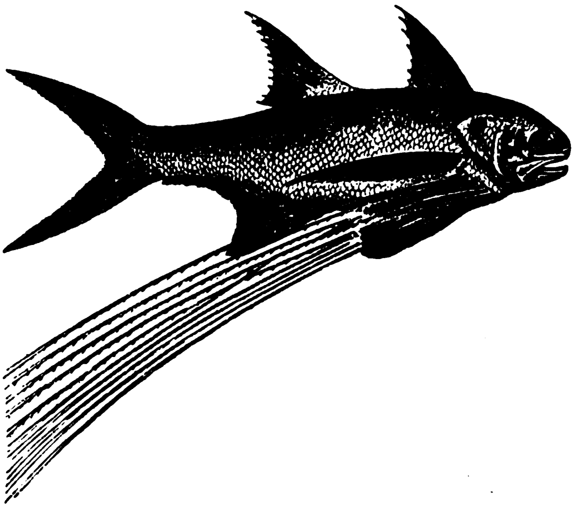
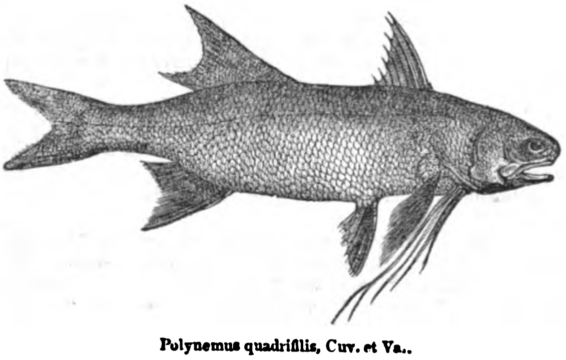
[*] See the 'Proceedings of the Zoological Society' for July, 1839.

Besides these species found on the coast of the mainland, two other species of Polynemus, *P. hexanemus* and *P. heptadactylus*, have been discovered off the coast of Java. On the coast of Africa and in the West Indies, certain species of the present genus are found. One of the African species is confounded by Cuvier with the Indian *P. longifilis*, and the mistake has been rectified by Mr. Bennett.[†] It appears that this species (which is in all probability the *Pentamenus* of Artedi, on which Linnæus established his *Pol. quinquarius*) differs from the Mango-fish of India in the number of free rays to the pectoral fins, the latter having seven rays, and the African species only five. MM. Cuvier and Valenciennes, not having found any species of *Polynemus* with so few as five free rays, and those longer than the body, imagined that the *Pol. quinquarius* was founded on a mutilated specimen. Several individuals[‡] however having this character being discovered by Captain Belcher, R.N., during his survey of a part of the Atlantic coast of North Africa, Mr. Bennett proposed to name the species after Artedi



Polynemus Artedii.

The second African species belongs to that section in which the free rays of the pectoral fins are short, and has received the name of *Polynemus quadrifilis*.



Polynemus quadrifilis, Cuv. et Va..

In the American Polynemus (*P. Americanus*) there are seven free rays to the pectoral fin, and these scarcely reach the tip of the ventral fins: it is about one foot in length, of a silvery colour; the pectoral fins are almost black, and the other fins are spotted with black.

POLYNE'SIA, a word formed from the Greek, and signifying 'many islands,' is a term which has not long been used in geography. When the numerous groups of islands dispersed over the Pacific, and the whole extent of what now is called Australia, became known, geographers felt the necessity of separating both from Asia, and of giving them a distinct description, and accordingly they sought for an appropriate name. The English geographers adopted that of Australasia, the German Australia, and the French Polynesia. Under this name the French geographers comprehended not only the several groups of islands which occur in the Pacific and the continent of Australia, but added to them all the islands east of the Bay of Bengal, or those which are commonly called the Indian Archipelago. But as those islands had always been considered an appurtenance of Asia, the name of Polynesia, in this extent of its signification, was not approved of, and it fell into disuse; and as it was not thought convenient to unite the great island of Australia with the other groups of the Pacific, the name of Polynesia has in modern times been restricted to those islands of the great ocean which are to the east of the Philippines, Moluccas, and Australia, and extend to the western coast of America. A few groups however, which are situated not far from the American continent, and therefore are considered as belonging to that continent, as Juan Fernandez, the Galapagos, and the Revillagigedo Islands, as well as the islands constituting the empire of Japan, the island of Formosa, and the Kurules, are excluded from this term. We shall merely enumerate the large islands and the groups of smaller islands comprehended under the name of Polynesia, as a more particular notice of them is given under their separate heads. South of the equator are Papua, the Admiralty Islands, New Ireland, with New Hanover, New Britain, Louisiade, New Georgia Archipelago, Queen Charlotte Islands, New Hebrides, New Caledonia, Vitis Islands, Friendly Islands, Navigator's Islands, Society Islands, Marquesas Islands, Pamuto Islands, and the isolated Easter Island; to which are to be added, south of the southern tropic, Pitcairn's Island, Norfolk Island, and the islands of New Zealand. North of the equator are the Pelew Islands, the New Philippines, the Ladrones, the Ralick, the Radack, and the Sandwich Islands.

POLYNOMIAL, an algebraical word meaning an expression which has several terms, being the general term under which are included, binomials, trinomials, quadrinomials, &c., or expressions of two, three, four, &c. terms. The *polynomial theorem* means the theorem by which a polynomial expression is raised to its several powers. For an easy way of doing this, see *Library of Useful Knowledge*, 'Diff. Calc.,' pp. 328-337.

POLYODONTA ('many-toothed tribe'), a name applied by Lamarck and M. de Blainville to the *Arcacea* of the former, the *Ark-shells*, &c. of collectors, comprehending the forms collected by Linnæus, in his 'Systema Naturæ,' under the genus *Arca*, and those designated by more modern zoologists as the genera *Arca*, *Cucullæa*, *Pectunculus*, and *Nucula*.

Lamarck's *Arcacea* constitute a part of his *Conchifères Ténuipèdes*, and are arranged by him between the *Cardiacées* and the *Trigonées*.

De Blainville places his family *Polyodonta* or *Arcacés* between the *Mytilacea* and *Submytilacea*.

Lamarck thus defines the family:—

'Cardinal teeth small, numerous, entering, and disposed in each valve in either a straight, a curved, or a broken line.'

M. Deshayes remarks, in the last edition of Lamarck, that the greater number of conchologists consider the family to be very natural, and not requiring any alteration, the relationship between the genera being apparent, and especially between *Cucullæa*, *Arca*, and *Pectunculus*; whilst the differences existing between them are of so little importance that their union under one natural genus may be well adopted. *Nucula* indeed does not appear to M. Deshayes to be so well connected with the preceding genera; for the *Nuculæ* are nacreous, a condition not observed in the others. The hinge teeth too of the *Nuculæ* have a different form, and they are in general more projecting than those of the *Arcæ* and *Pectunculi*; the position of their ligament distinguishes them still further. In the three preceding genera the ligament is external, and rolled up, as it were, behind the hinge; in the *Nuculæ* it is internal, and received into a small spoon-shaped cavity placed in the angle formed by the cardinal hinge. It is true, says M. Deshayes, in continuation, that among the *Nuculæ* are comprehended many species in which the ligament is external as in the *Pectunculi;* and these species are not nacreous. M. Deshayes suggests that it may be convenient to withdraw these species from the genus *Nucula*, to place them among the *Arcæ* and the *Pectunculi*, and thus separate them from the family of the *Arcadæ*, which family would be then well characterised by the position of the ligament and the nature of the hinge. He further, with reference to the figure published by M. Quoy, in the 'Voyage of the Astrolabe,' of the animal of a *Nucula* placed beneath that of a *Trigonia*, acknowledges that there is no denying that more analogy exists between them than had been at first supposed; but he also says that it is necessary to remark that the animal of the *Nucula* represented belongs to a species which has an external ligament, and which by that very organization approaches the *Trigoniæ* more than the others.

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[*] The author most probably means the *P. tetradactylus*, which is an Indian species; the P. quadrifilis being an African species.

[†] See 'Proceedings of the Zoological Society' for 1830-31, p. 146.

[‡] The specimens referred to are in the museum of the Zoological Society.

M. Rang makes the *Arcadæ* consist of the genera *Cucullæa*, *Arca*, *Pectunculus*, *Nucula*, and *Trigonia*, and gives the following as the character of the family:—

Animal having the mantle entirely open throughout its circumference, excepting towards the back, without tubes or any particular apertures, and partially adherent; sometimes prolonged backwards; the foot always very considerable.

Shell generally thick, regular, equivalve, inequilateral, with a similar hinge in each valve always formed of serial teeth, which are often lamellar, fitting into each other, straight or oblique; muscular impressions nearly always united by a pallial impression, which is very narrow, and parallel to the border of the shell.

In this article we shall confine ourselves to the genera *Cucullæa*, *Arca*, *Pectunculus*, and *Nucula*. *Trigonia* will be treated of under TRIGONIA.

Cucullæa. (Lam.)

Generic Character.—*Animal* very thick, having the mantle a little prolonged backwards, and bordered by an irregular row of tentacular filaments; labial appendages small and triangular; foot large, pedunculated, compressed, and slit longitudinally.

Shell thick, navicular, equivalve, inequilateral, ventricose, with distant umbones; hinge linear, straight, formed of small transverse teeth for the greatest part of its length, and of many other teeth or longitudinal ribs; ligament entirely external; anterior muscular impression forming a projection with an angular or auriculate border. (Rang.)

M. Deshayes remarks that the *Cucullææ* differ but little from the *Arcæ*, and although they have a particular form, there are some species of the latter genus which establish the passage between the two genera. He observes that what most essentially distinguishes the *Cucullææ* from the *Arcæ*, are the transverse ribs placed at the extremities of the hinge, which ribs articulate together like the teeth of the *Arcæ*. All the *Arcæ*, he adds, have not the cardinal teeth upon a straight line; for this line in some species is curved at the extremities, and then the teeth become oblique, and in some species transverse: such species are closely approximated to *Cucullæa* in the hinge. Upon these grounds M. Deshayes is of opinion that the *Cucullææ* should be reunited to the *Arcæ* as a subdivision of the latter.

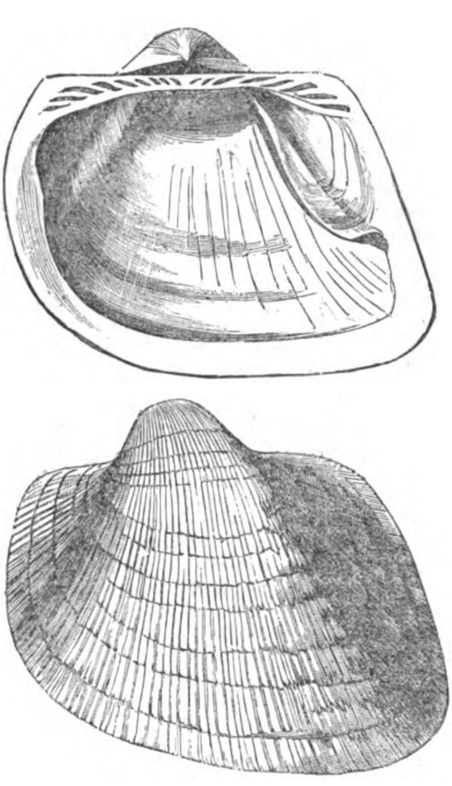
M. de Blainville had previously come to the same conclusion, for, in his 'Manuel de Malacologie,' he had, as will be seen more in detail when we come to treat of *Arca* properly so-called, made *Cucullæa* one of the subdivisions of that genus.

The number of recent species of *Cucullæa* recorded by M. Deshayes in his tables is one only; nor are any more noticed in the last edition of Lamarck.

This species is the *Arca concamerata* of Martini, *Arca Cucullus* of Gmelin, *Arca cucullata* of Chemnitz, and *Cucullæa auriculifera* of Lamarck, under which last name it is generally known; but, as M. Deshayes well remarks, Martini's name has the priority, and it ought to be that by which the species should be designated.

Description.—The shape of the shell, which is of fair size, will be seen better from the subjoined cut than from verbal description. The longitudinal striæ are more marked than the transverse striæ. The colour is rather a deep cinnamon-brown externally, and internally on the anterior part brown tinged with violet.

Locality.—The Indian Ocean; sandy bottoms.



Cucullæa auriculifera.

Arca. (Linn.)

Animal more or less thick, generally rather elongated; mantle prolonging itself slightly backwards, and with a row of tentacular filaments on its borders; labial appendages very small and slender; foot pedunculated, compressed, and slit throughout its length.

Shell navicular, rather thick, equivalve, inequilateral, elongated, more or less oblique; umbones distant and often a little recurved forwards; hinge linear, straight, furnished throughout its length with a numerous row of small teeth or transverse laminæ, which are equal and intrant; ligament entirely external.

M. Rang, who gives the above as the characters of *Arca*, remarks that the species sometimes adhere by their foot, and more frequently by means of a byssus.

M. Deshayes, in the last edition of Lamarck, observes that the organization of this genus has been well known since the publication of the great work of Poli, 'Testacea utriusque Siciliæ,' where he has demonstrated the anatomy of *Arca Noæ;* and that it were to be wished that the anatomy of a species which is perfectly closed, *Arca antiquata*, for example, should be detailed in the same manner. The external form of the animal approximates much to that of the shell itself; the lobes of the mantle are disunited throughout its length; they are delicate, and leave towards their median part a small gap corresponding to that of the shell: the body is rather thick. From the median part of the abdominal mass is elevated a very short thick truncated foot, offering at its truncation an oval and rather considerable mass of horny compact matter, in lieu of the silky byssus of some other *Conchifera*, and which serves both for attachment and also as a sort of *operculum* to close the gaping of the valves into which it passes. On each side of the body may be seen, nearly throughout the length of the animal, two branchiæ, which are nearly equal, and composed of very fine and very flexible detached filaments. At the anterior part of the foot and of the abdominal mass there is a transverse slit of a moderate extent, having on each side two slightly projecting lips, but which are prolonged to the lateral parts of the body: this slit is the buccal aperture, and the lips are the labial palps. There are two adductor muscles which attach the animal to the shell; they are distant and situated at each extremity, the posterior being the most considerable. The animal is provided with powerful muscles proper to the foot, and these last leave on the internal and superior surface a particular impression much larger than is seen in the greater number of the other animals of this class. The buccal aperture leads into a narrow and rather long œsophagus, at the side of which and opening at its lower part is a small elongated pouch, in which is contained a small horny stylet. The œsophagus terminates at a very small globular stomach, in the walls of which are seen large crypts, by which the liver, which envelopes it, pours in its secretion. The intestine is slender, and makes only a single circuit, so as to reach the dorsal and median line, passes behind the posterior retractor muscle, and terminates by an anus turned downwards. The organs of circulation have a particular disposition in the *Arcæ*, very different from what is known in the other *acephalous mollusca*. In nearly all the mollusks of this class the heart has a single ventricle embracing the rectum, and placed in the dorsal and median line of the animal. In the Arks, the back of the animal being very wide and the branchiæ very distant at their insertion upon the lateral parts of the body, there is a ventricle and an auricle for each pair of branchiæ, or, in other words, there are in this genus two hearts. The nervous system is very considerable: the principal branches of it are to be seen on the internal surface of the posterior retractor muscle.

M. Deshayes adds, that if this organization be compared with that of the *Pectunculi*, sufficient differences will be found to justify the separation of the two genera; but he appears to think that this might not be the case if the animal of those *Arcæ* which have no byssus were known.

M. de Blainville divides the *Arcæ* into the following subdivisions:—

A. (*Les Navicules.*)

Navicular species; the hinge completely straight; the foot tendinous and adherent. (*Byssoarca*, Sw.) [Byssoarca.]

Example, *Arca Noæ*.

B. (*Les Bistournées*—Genus *Trisis*, Oken.)

Example, *Arca tortuosa*.

C. (Genus *Cucullæa*, Lam.)

Navicular species; the hinge completely straight; the terminal teeth much longer and more oblique than the others.

Example, *Cucullæa auriculifera*, Lam.

D.

Species with a straight hinge not notched or not gaping inferiorly.

Example, *Arca barbata*.

E. (Les Rhomboides.)

Species well closed, of less elongated form, more pectinoid, and with a straight hinge.

Example, *Arca rhombea*.

F.

Oval species, elongated or a little arched longitudinally, slightly gaping inferiorly, with the umbones at little distance from each other, the ligament nearly internal, and the dental line a little bent.

Example, *Arca mytiloïdea*.

The number of recent species recorded by M. Deshayes, in his Tables, is forty-three, and of these *Arcæ semitorta*, *Noæ*, *tetragona*, *umbonata*, *barbata*, *Magellanica*, *Helbingii*, *antiquata*, *rhombea*, *clathrata*, a new species, *Gaymardii*, and *Quoyi*, are noted as both living and fossil (tertiary). In the last edition of Lamarck forty is the number given. Both these numbers are however below the mark. For instance, no notice is taken in Lamarck of the fifteen new species collected by Mr. Cuming, and described by Mr. G. B. Sowerby. (*Zool. Proc.*, 1833.)

The following descriptions and cuts will give some idea of the difference of form assumed by the shells of this genus:—

Arca Noæ.

Description.—Shell oblong, striated; apex emarginate; umbones very remote, incurved; margin gaping.

Locality.—Atlantic Ocean, seas of Europe.

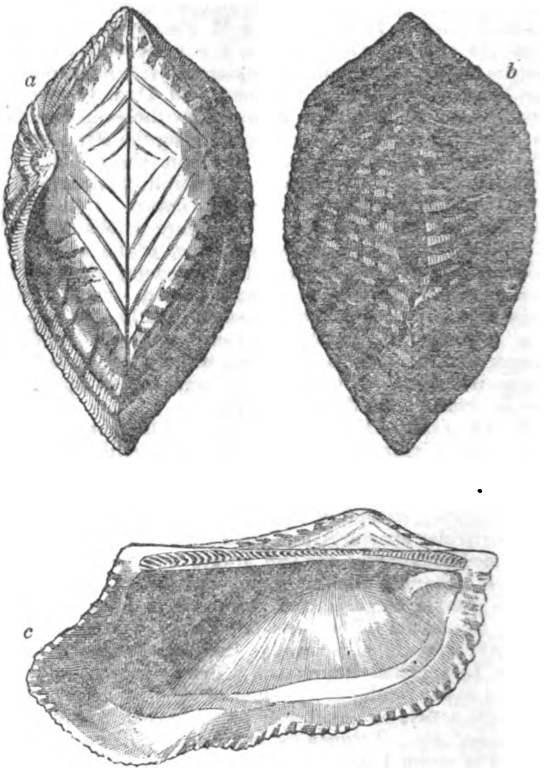
Arca tortuosa—(Genus *Trisis*, Oken).

Description.—Shell twisted, parallelipiped, striated; valves obliquely carinated; umbones small, recurved.

Locality.—The Indian Ocean.

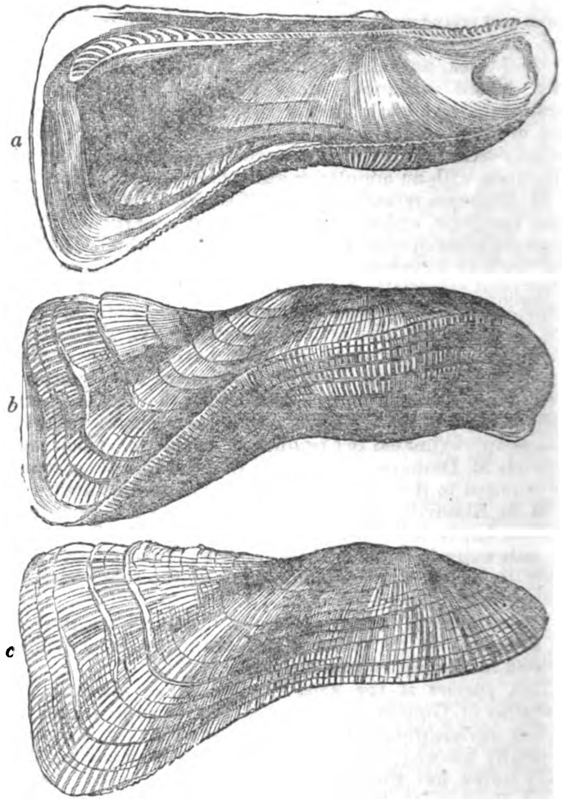
Arca antiquata.

Description.—Shell transverse, obliquely cordate, ventricose, many-ribbed; the ribs transversely striated and blunt; the posterior ribs bifid. Colour white.



Arca Noæ.

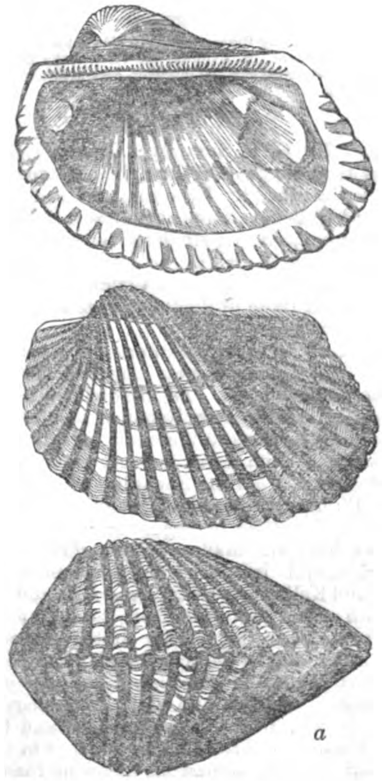
a, valves closed, with the umbones and area of the hinge towards the spectator; *b*, valves closed, with the ventral or inferior aspect, showing the margin, opposite to the spectator; *c*, internal view of one of the valves.



Arca tortuosa.

a, internal view of a valve; *b*, valves closed, the ventral or inferior margin towards the spectator; *c*, external view of a valve.

Locality.—Lamarck gives the Indian Ocean, the coasts of Africa, and the Mediterranean as the localities of this species, of which M. Deshayes, in the last edition of the *Animaux sans Vertèbres*, says that he is convinced that since the time of Linnæus two species at least have been confounded under the denomination of *Arca antiquata*, although they are easily distinguished; the one, more transverse, has the cardinal surface always furrowed into lozenge shapes when the valves are united; the other having a thicker shell, the ribs flatter, wider, and striated, but never with furrows on the cardinal surface. This last, being the most common and most antiently known, should, in his opinion, retain the name of *Arca antiquata*, and he cites the following figures of the shell:—*Gualt. Test.*, pl. 87, f. C; Chemn., *Conch.*, t. vii., pl. 55, f. 548; *Encyclop.*, pl. 306, f. 2; Gronov., *Zooph.*, pl. 18, f. 13. M. Deshayes further remarks, that the shell figured by Poli and cited by Lamarck in the synonymy constitutes a species distinct from the two others. He adds that this, which inhabits the Mediterranean, is the living analogue of *Arca diluvii*. Neither, in his opinion, is the *Arca antiquata* of Brocchi a true *antiquata*, but the *Arca diluvii*, the fossil analogue of the species figured by Poli.



Arca antiquata.

a, valves closed, inferior or ventral margin towards the spectator.

Habits of the Genus.—The *Arcæ* have hitherto been found on bottoms of sandy mud and mud, at depths varying from the surface to seventeen fathoms. Some of the species are moored to stones, corals, &c.

Pectunculus, Lam.

Generic Character.—Animal rounded, more or less thick, with no tentacular filaments on the border of its mantle; labial appendages very narrow; foot large, compressed, and slit longitudinally.

Shell lenticular, thick, solid, equivalve, subequilateral, entirely closed; umbones rather small and more or less distant; hinge formed of a curvilinear row of small narrow, rather numerous, intrant teeth, which are often incomplete under the umbones; ligament external. (Rang.)

Habits of the Genus.—The Pectunculi live on sandy or muddy bottoms, and have been found at depths ranging from five to seventeen fathoms. They move by means of the foot, which the animal uses to propel itself.

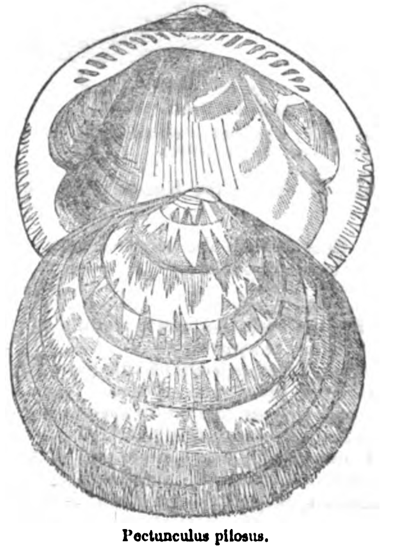
M. Deshayes observes, in the last edition of Lamarck, that if, in some important points, the organization of the *Pectunculi* differs from that of the *Arcæ*, in others great analogy exists. The *Pectunculi*, having no byssus, live free, and have a foot formed nearly like the edge of an axe. When that organ is contracted, the edge seems simple; but when the animal dilates it, its lower part exhibits an oblong disk circumscribed by a sharp border: this disk bears much resemblance to that upon which the Gastropods creep. The branchiæ are formed of long filaments, as in the *Arcæ;* the abdominal mass is considerable, and the foot is attached throughout its length. The buccal aperture is between the anterior part of the abdominal mass and the anterior retractor muscle; it is in the shape of a transverse slit between the two lips, which are prolonged on each side of the muscle and ascend nearly to the base of the branchiæ. The œsophagus is long and narrow, and has no horny stylet; it terminates in a pyriform stomach, from which comes a slender, cylindrical, and very long intestine, which, after having made many circumvolutions, arrives at the median and dorsal part of the animal, passes behind the posterior adductor muscle, is contorted so as to follow its surface, and terminates towards its inferior border, where it ends in a floating anus. The heart is simple; a single ventricle embraces the rectum; the auricles are very large, and do not pour out the blood to the branchiæ by their border, but they terminate anteriorly by two vessels, which are curved backwards so as to furnish a small vessel to each of the branchial filaments.

The number of living species stated in the tables of M. Deshayes is nineteen, and of these the following are recorded as both living and fossil (tertiary):—*Pectunculi glycymeris*, *pilosus*, *violacescens*, and *nummarius*. The number given in the last edition of Lamarck is twenty; but the nine species named and described by Mr. Broderip and Mr. G. B. Sowerby respectively, from Mr. Cuming's collection (*Zool. Proc.*, 1822; Müller, *Synopsis*), are omitted.

Example, *Pectunculus pilosus*.

Description.—Shell orbiculate; ovate, tumid, marked with decussate striæ; umbones oblique; epidermis brown, hairy.

Localities.—The Mediterranean and the Atlantic Ocean. (Lam.)



Pectunculus pilosus.

Nucula, Lam.

Generic Character.—Animal rather thick, subtriquetrous, having the mantle open only in its inferior moiety, with entire borders, denticulated throughout the length of the back, without posterior prolongations; anterior buccal appendages rather long, pointed, stiff, applied one against the other, like a kind of jaws, the posterior ones equally stiff and vertical; foot very large, delicate at its root, enlarged into a great oval disk, the borders of which are furnished with tentacular digitations.

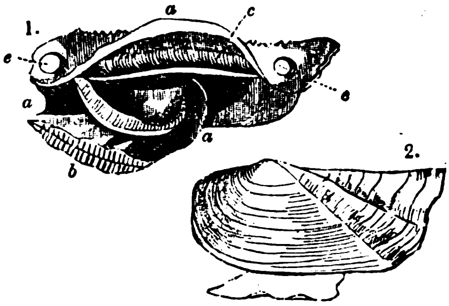
Shell rather thick, sometimes nacreous, subtriquetrous, equivalve, inequilateral; umbones contiguous and curved forwards; hinge formed on each valve of a numerous row of small pointed teeth, disposed in a line broken under the umbo; ligament in great part internal, short, and inserted in a small oblique fosset in each valve. (Rang.)

Habits of the Genus.—The species have been found on bottoms of sandy mud and sand, both in æstuaries and the open sea, at depths varying from the surface to sixty fathoms. According to Mr. Cuming, the same species vary much as to the depths at which they live; for he found

N. cuneata from fourteen to forty-five fathoms; *N. obliqua* from fourteen to sixty fathoms; and *N. Pisum* from seventeen to forty-five fathoms.

M. Deshayes, in the last edition of Lamarck, remarks, that though there is a species of *Nucula* widely spread in the British Channel and the Mediterranean, the animal remained unknown until M. Quoy figured that of a large and very curious species in the 'Voyage of the Astrolabe.' This animal, observes M. Deshayes, has, as Lamarck predicted, much analogy with that of the *Pectunculi* and *Arcæ*. The foot is compressed laterally, and slit at its free border, so that it can be dilated into a disk for creeping progression. The mantle-lobes are disunited throughout the length of their inferior border. The abdominal mass is not thick, and the foot is attached to it throughout its length; on each side and above are found the branchiæ, which are nearly as long as the entire animal, and very narrow. According to the figure, they seem to be composed of detached filaments, as in the *Arcæ* and *Pectunculi*.

In front of the abdominal mass, and near the anterior adductor muscle, is the mouth, on each side of which is a pair of palps, very narrow and very much elongated on each side of the visceral mass: these palps are foliaceous on their internal surface. The internal organization does not appear to be known; but M. Deshayes is of opinion that it may be predicated to bear much resemblance with that of the *Pectunculi*.



Animal of Nucula Australis.

1. *a a*, mantle; *b*, foot; *c*, branchia; *e e*, adductor muscles. 2. Outline of shell, with the foot of the animal projecting.

M. de Blainville divides the *Nuculæ* into two sections:—

A.

Species with the border entire.

Example, *Nucula rostrata.*

B.

Species with the border crenulated.

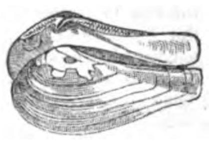
Example, *Nucula margaritacea.*

The number of recent species of this genus in the Tables of M. Deshayes is seven, and of these, *Nuculæ margaritacea, Pella, emarginata,* and a new species, are recorded as occurring both living and fossil (tertiary). In the last edition of Lamarck the number recorded is ten. M. Deshayes however, who seems to confound the authors of the 'Mineral Conchology' and the 'Genera,' considering them as identical, says that Mr. Sowerby has added some living species in his genera, but that it is to Mr. Cuming to whom we owe the knowledge of the greatest number. He then proceeds to state that the latter has described them in the 'Proceedings of the Zoological Society of London,' and caused them to be figured in the 'Conchological Illustrations' published by Mr. Sowerby, and that he has described thirty-four living species. Still he gives but four of the new species in the text, attributing the names and descriptions to Mr. Cuming, who certainly collected them, but did not describe one. The names and descriptions are by Mr. G. B. Sowerby, who described ten from Mr. Cuming's collection, in the 'Zoological Proceedings' for 1832 (see also Müller's 'Synopsis'), which, strangely enough, are quoted by M. Deshayes for the description of the four which he has admitted into the body of the new edition of the 'Animaux sans Vertèbres.'

The following descriptions and cuts will give some idea of the forms of this genus.

Example, *Nucula rostrata.*

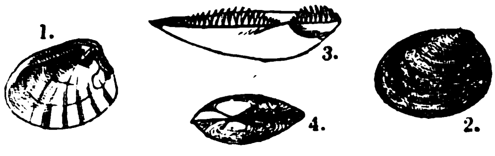
Description.—Shell transverse, oblong, rather, convex, thin, transversely striated; anterior side longest, attenuated and rostrated.



Nucula rostrata.

Example, *Nucula margaritacea.*

Description.—Shell obliquely ovate, trigonal, rather smooth; cardinal teeth straight, acute; margin crenulated.



Nucula margaritacea.

1. Interior of valve, showing the teeth on each side of the hinge and the cartilaginous pit in the centre. 2. Exterior. 3. View of the teeth, the dorsal margin of the shell being towards the observer, enlarged. 4. Valves closed, showing the umbones.

FOSSIL ARCADÆ.

Cucullæa. Mr. G. B. Sowerby ('Genera') notices the fossil species as numerous; of these, he observes, one (*Cuc. crassatina*) is described by Lamarck, and is found in the neighbourhood of Beauvais and at Bordeaux, in beds similar to that of Grignon, but in England several species occur, both in the greensand and in the inferior oolite, and are engraved in Sowerby's 'Mineral Conchology.' Mr. G. B. Sowerby adds, that those of the inferior oolite are also found at Bayeux in Normandy.

The number of fossil species (tertiary) recorded by M. Deshayes in his Tables is two. In the last edition of Lamarck the number is six. Dr. Mantell, in his 'Tabular Arrangement of the Organic Remains of the County of Sussex,' notes a *Cucullæa* in the chalk marl, and adds that M. Brongniart sent him a similar cast from Rouen; also *Cucullæa decussata*, from the Shanklin sand (Feversham).

Professor Phillips ('Organic Remains of the Yorkshire Coast') records *Cucullææ oblonga, contracta, triangularis,* and *pectinata*, from the coralline oolite; *elongata* from the coralline, Bath, and inferior oolite; *concinna* from the Oxford clay and Kelloway's rock; *imperialis* and *cylindrica* from the Bath oolite; *cancellata* from the Bath and inferior oolite; *reticulata* from the inferior oolite; and notices the occurrence of the form in the Speeton clay and the lias. In the second part (1836) he describes *Cucullææ obtusa* and *arguta* (Bolland). ('Illustrations of the Geology of Yorkshire.') Dr. Fitton, in his 'Stratigraphical and Local Distribution of Fossils,' in his valuable paper 'On the Strata below the Chalk' (1839), notices the following *Cucullææ*:—*carinata* (Blackdown); *costellata ?* (lower green-sand, Kent; Blackdown, Devon); *decussata* (upper green-sand, Isle of Wight; lower green-sand, Kent and Sussex; Blackdown); *fibrosa* (Blackdown, Devon); *formosa* (Blackdown); *glabra* (upper green-sand, Isle of Wight; lower green-sand, Kent; Blackdown, Devon); *glabra ?* (lower green-sand, Sussex); *doubtful* (upper green-sand, Hampshire; lower green-sand, Kent); *one or two* other species (lower green-sand, Sussex); *new* (lower green-sand, Kent; Oxford oolite, Cambridge); a *Cucullæa* without any designation (lower green-sand, North Wilts); and a *small species* from the Portland sand, Dorsetshire.

Mr. Lonsdale, in his elaborate paper 'On the Oolitic District of Bath,' mentions *Cucullæa oblonga* (inferior oolite, Widcombe Hill) and *Cucullæa glabra* (upper green-sand, neighbourhood of Warminster). Mr. Murchison ('Silurian System') describes and figures *Cucullæa antiqua* from the old red-sandstone (middle and lower beds only) and the upper Ludlow rock; *Cuc. Cawdori* from the upper Ludlow rock, with a ?; and *Cuc. ovata* from the old red-sandstone (middle and lower beds only). Professor Sedgwick and himself had previously given Gosau as a locality for *Cucullæa carinata.* ('Structure of the Eastern Alps.')

Arca. The number of fossil species (tertiary) given by M. Deshayes in his Tables is fifty-four, several of which, as we have seen above, he records as both living and fossil (tertiary). In the last edition of Lamarck no more than eighteen, fossil only, are catalogued. Dr. Mantell mentions two or three undetermined species from the chalk marl (Ringmer), and *Arca carinata* from the firestone or upper green-sand, Southbourn, Sussex, and Devizes); and another (a very imperfect cast) from the galt or Folkstone marl (Ringmer). Professor Phillips notes *Arcæ quadrisulcata* and *æmula* from the coralline oolite, Yorkshire; Mr. Lonsdale notes an *Arca* from the inferior oolite (canal banks opposite Limpley Stoke), and another from Frome; also one from the Bradford clay. Professor Sedgwick and Mr. Murchison record one from Gosau. Dr. Fitton gives *Arca carinata* from the upper green-sand, Hampshire; *A. rotundata* from Blackdown, and an uncertain species from the lower green-sand, North Wilts, the Portland stone, Oxford, and the Oxford oolite, Cambridge. Mr. Murchison ('Silurian System') describes and figures *Arca Eastnori* from the Wenlock shale.

Pectunculus. Mr. G. B. Sowerby ('Genera') states that all the species known to him are found either in the London clay or the calcaire grossier; he says that a very neat one occurs in the indurated marl at Bognor, where it is accompanied by fossil *Pinnæ, Linguli,* &c., and he has figured it, believing it to be a variety of Lamarck's *Pectunculus pulvinatus,* 'but in truth,' he adds, 'it is so difficult to fix the characters of the species of this genus, that we dare not speak decidedly upon this point.' M. Deshayes enumerates, in his Tables, twenty-seven fossil species (tertiary), and of these he notices three, as above mentioned, as both living and fossil (tertiary). In the last edition of Lamarck but fifteen species, fossil only, are catalogued. Dr. Mantell notes *Pectunculus pulvinatus* from the blue clay of Bracklesham; *P. brevirostris* and *P. decussatus*[*] from the arenaceous limestone or sandstone of Bognor. Professor Sedgwick and Mr. Murchison enumerate *Pectunculi Plumsteadiensis, brevirostris, pulvinatus?* and *calvus* from the Gosau deposits; and Mr. Lea describes and figures *Pectunculi Broderipii, minor, deltoideus, ellipsis,* and *obliqua* from the Claiborne beds (tertiary), Alabama.

Nucula. The number of fossil species (tertiary) published in the Tables of M. Deshayes is twenty-three, and four are enumerated as both living and fossil (tertiary). (See above.) In the last edition of Lamarck only seven are catalogued as fossil only. Dr. Mantell notices *Nucula pectinata* from the gault or Folkstone marl; and *Nuc. impressa* from Blackdown. Professor Phillips records *Nuculæ ovata* and *subrecurva* from the Speeton clay; *subrecurva* from the inferior oolite; another from the coralline oolite; *elliptica* and *nuda* from the Oxford clay; *variabilis* and *lachryma* from the Bath and inferior oolite; *axiniformis,* inferior oolite; *ovum* and *complanata,* upper lias; *cuneata, tumida, undulata, claviformis ?* and *Luciniformis* (Bolland, &c.), and *brevirostris,* Harelaw, Northumberland. (*Yorkshire.*) Mr. Lonsdale notes *Nucula pectinata* from the Bradford clay; and another from the forest marble. Professor Sedgwick and Mr. Murchison give us *Nuculæ amygdaloides* and *concinna* in their list of *Gosau Fossils.* Dr. Fitton enumerates *Nuculæ angulata* (Blackdown); *antiquata* (lower green-sand, Sussex, and Blackdown); *apiculata* (Blackdown); *bivirgata* (gault, Kent); *impressa* (lower green-sand, Sussex, and Blackdown); *lineata* (Blackdown); *obtusa* (Blackdown); *ovata* (gault and lower green-sand, Kent); *pectinata* (gault, Kent, Cambridge, South Wilts, Blackdown, Devon); *undulata ?* (gault, Kent), and another (gault, Bedford).

Mr. Murchison figures and describes *Nuculæ ? ovalis,* and *lævis*; the first from the upper Ludlow rock, the second from the Llandeilo flags. ('Sil. Syst.') Mr. Lea describes and figures *Nuculæ Sedgwickii, ovula, pectuncularis, Brongniarti, media, pulcherrima, plicata, magna, carinifera, plana,* and *semen,* from the Claiborne beds.

POLYPE. The discoveries of Trembley regarding the structure and animal functions of the phytoïd Hydræ, and Plumatellæ of fresh water, opened a new field of research into the nature and relations of many neglected forms of life, and gave occasion for much correct inference and baseless conjecture. Borrowing from Aristotle and Pliny the term Polypus, by them applied to a cephalopod, the systematic naturalists who followed Linnæus collected under this title many really animalised masses in the form of plants, and after abundant examinations by Ellis and others of the membranous, horny, or stony 'fulcra,' bases, or axes, which remain after desiccation or decay of the softer parts, generally agreed in opinion that to all these plant-like bodies were associated active living animals like the Hydræ described by Trembley.

As in a tree the flowering and reproductive organs manifest more active and varied functions than the general mass of bark and wood which serves to unite them in one common life, so in these Zoophyta the little Polypi expanding from their cells for food, light, or aëration, and shrinking back upon the agitation of the water, or withdrawal of the light, seemed like so many animal flowers, which might be studied apart from the Polypiaria which they adorned. They were in fact studied apart, and unfortunately attention was more directed to the wonderful permanent fabric, or 'Polypidom,' as Lamouroux calls it, than to the Polypi themselves. Hence the imperfection of all the schemes of classification for this portion of the Zoophytic division of the animal kingdom, and many of the erroneous generalizations and hypotheses regarding the lower forms of animal life. There was besides a real impediment in the way of accurate and satisfactory observation of these minute parts of creation in the imperfection of microscopes. Until Amici, Chevalier, Prichard, Plösl, gave us powerful reflecting and achromatic engines, it was vain to look for stomachs in the Polygastrica and a variety of internal organization in the supposed simple Polypi of the so-called 'sea-weed.'

One of the most interesting disquisitions on the Polypean races—that of Lamarck ('Anim. sans Vertèb.,' tom. i.)—fixed for these animals the characters of gelatinous contractile body; alimentary canal with a single opening surrounded by ciliæ or tentacula; reproduction by gemmæ, internal or external; organs of sense, respiration, or fecundation none; often associated into compound existence. If to these definitions we add the notion of extraordinary tenacity of life, manifested by the survival and multiplication of Hydræ under the knife, the surprising fact ascertained in the Hydra by Trembley of the external surface taking up the function of digestion when the animal was turned inside out, the varieties of gemmiparism observed in Sertularia, Cellaria, &c., by Ellis and others, and the employment of the tentacula or ciliæ around the mouth,—we shall see the state of this branch of zoology in the time of Lamarck.

That distinguished systematist presented a very simple and popular classification of Polypes, namely:—

Polypi ciliati, as many of the Rotiferous Infusoria.
Polypi denudati, as the Hydra.
Polypi vaginati, as the compound Sertulariæ, Corals, &c.
Polypi tubiferi, as the Lobularia and its allies.
Polypi natantes, as the Pennatulariæ.

The Actiniæ, thus expressly excluded from the class of Polypi, are very closely related to them. They are accordingly placed with them by Dr. Johnston, in his easy and effective system, thus:—

Subclass 1. Radiated Zoophyta

Body contractile in every part, symmetrical; alimentary canal with one opening; gemmiparous and oviparous.

Order 1. Hydroida. Polypes compound; mouth with filiform simple tentacula; stomach excavated in the cellular substance of the body; no distinct muscular apparatus, the body contractile in all its parts; gemmiparous externally; polypidom (if existing) external to the polypes. (Hydra, Sertularia, &c. Nudibrachiata of Farre.)

Order 2. Asteroida. Polypes compound; mouth encircled with 8 fringed tentacula; gemmiparous internally; stomach membranous; polypidom an internal axis. (Gorgonia, &c.)

Order 3. Helianthoïda. Polypes single; mouth encircled by tubulous (aquiferous?) tentacula; stomach membranous, plaited; oviparous by internal ovaria. (Actinia, &c.)

Subclass 2. Molluscar Zoophyta. (Ciliobrachiata of Farre. Bryozoa of Ehrenberg.) Body not contractile, symmetrical; mouth and anus separate; gemmiparous and oviparous.

Order 4. Ascidioida. Polypes aggregated; the mouth encircled with filiform ciliated tentacula; stomach distinct, intestine recurved to an anus near the mouth; ova internal. (Cellaria, &c.)

Thus we find among the Cellaria, Flustra, &c., which Lamarck ranked in his Polypi, animals quite different from his type, and making very near approach to the higher group of Tunicate Mollusca. On the other hand, Sponges, which Lamarck admitted, are excluded by Johnston and many modern writers, and constitute, in Dr. Grant's view, the class of Porifera. Whether they be of vegetable or animal origin, they certainly have no polypi. Dr. Farre (*Phil. Trans.* for 1837), who has paid successful attention to some of the higher groups of Polypi, and who unites in one group, Anthozoa, the second and third orders of Dr. Johnston, says, 'it appears that under the commonly received name of Polypi there exist three distinct types of structure, which must be referred to the same number of separate classes, possessing but few points in common, and these generally of the most superficial kind.' [POLYPIARIA; ZOOPHYTARIA.]

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[*] Dr. Mantell observes that, as it differs from the recent *P decussatus,* different specific name should be found for it.

POLYPHE'MUS (Conchology), De Montfort's name for a genus consisting of those species of *Achatina* which have elongated apertures, short spires, and an undulation in the outer lip.

Example, *Polyphemus Glans.*

Polyphemus is also a name given by Müller and others to certain crustaceans belonging to the order *Lophyropa*, Latr.

POLYPHY'LLIA. [MADREPHYLLIŒA.]

POLYPHY'SA, the genus formed by Lamouroux for a marine plant-like body allied to Corallina. [PSEUDOZOARIA.]

POLYPIA'RIA. In subdividing the Linnæan Zoophyta, naturalists have generally recognised the propriety of separating in one distinct class the compound, plant-like, generally polypiferous animals; Lamarck, Lamouroux, and Cuvier agree in this. Blainville's system of classification employs the term Polypiaria for one of several related classes (procured by dismemberment of Lamarck's Polypi), and divides it into four important subclasses, viz. Polypiaria solida, Polypiaria membranacea, Polypiaria dubia, Polypiaria nuda. In the present article we shall present a condensed view of the three latter classes, referring for the two families of the first to their respective titles, MILLEPORIDÆ and TUBULIPORIDÆ; and for some general views of the classification of Polypian animals to POLYPE and ZOOPHYTARIA.

The active animal parts of the Polypiaria of Blainville are generally of slender figure, provided with filiform tentacula in one row, and either nude or contained in cells of various form and substance, but never lamelliferous, agglomerated together.

The subclasses are thus defined:

Polypiaria solida. Animals contained in small calcareous cells, with a terminal opening, accumulated into a solid fixed polyparium. Ovaria internal?

Fam. 1. Milleporidæ.
Fam. 2. Tubuliporidæ.

Polypiaria membranacea. Animals very short, urceolated, provided with many tentacula (often ciliated) in one row, contained in membranous, rarely calcareous, adherent cells, with a more or less bilateral opening. Ovaries external.

Fam. 1. P. operculifera.
Fam. 2. P. cellariæa.
Fam. 3. P. sertulariæa.

Polypiaria dubia. Animals urceiform, provided with long (often ciliated) tentacula, arranged in a curvilinear form above and around the opening of the mouth, and springing from a common membranous basis. (*Zoophyta ascidioïda;* Fam. *Limniadæ*, Johnston.)

Polypiaria nuda. Body gelatinous, very contractile, free, excavated into a gastric cavity, of simple form, provided at its entrance with cirrhose tentacula; no trace of viscera; reproduction by external germs. (Part of Zoophyta hydroïda of Dr. Johnston.)

POLYPIARIA MEMBRANACEA.

Fam. 1. *Operculifera* or *Eschariæa.*

Animals provided with a horny operculum for closing the cells which contain them. Intestinal canal with two openings. (Dr. Johnston includes them in his order of Zoophyta ascidioïda. Milne Edwards calls them Bryozoaria. They belong to Dr. Farre's Ciliobrachiata.)

Genera.

Myriapora.

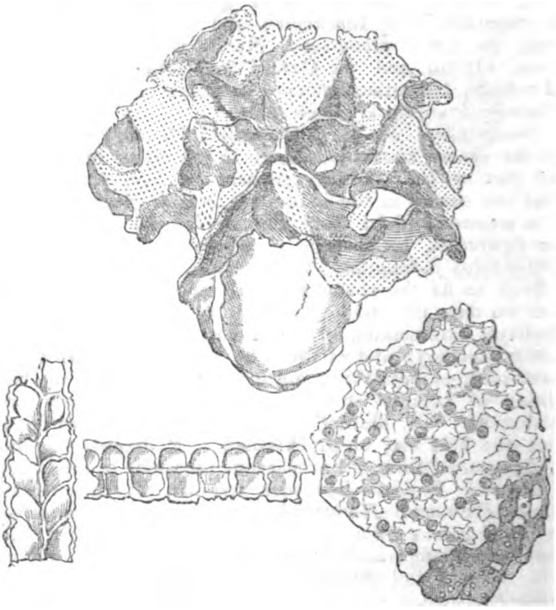
Animals cylindrical, terminating anteriorly in a tubular extensible proboscis, surrounded by many simple tentacula arranged into the shape of a funnel; on one side of this body is a cartilaginous round operculum. Cells simple, oval, with a small round opening, united into a calcareous, fixed, ramified, finely porous polyparium.

Example, Millepora truncata, Linn. (recent). Sol. and Ellis, tab. 23, f. 1-8.

Eschara.

Animals swollen in the cephalic region, and bearing a circle of simple filiform ciliæ. Cells not prominent, indistinct externally, having a depressed small round operculated orifice, uniting regularly in quincunx, so as to constitute a calcareous, brittle, friable, porous, leaf-like polyparium of variable shape.

Example, Eschara foliacea. Ellis's 'Corallines,' t. 30, f. *a*, *b*, *c*.



Eschara foliacea.

Blainville includes in this genus several Celleporæ of Linnæus, Goldfuss, and Fleming. Mr. Lonsdale gives a fossil species from the Silurian rocks, and Goldfuss names no less than twelve from the chalk and tertiary strata.

Milne Edwards has proposed to divide the genus into three, according to the structure of the cells (*Ann. des Sci. Nat.*, 2nd series, tom. vi.):—

Eschara, in which the adjoining cells are closely united, and the anterior part is semicorneous.

Membranipora, with a calcareous border and a membranous centre to the cell.

Escharina; cells juxtaposed, circumscribed, the extero-anterior parietes calcareous to the edge of the small operculated opening.

Of this genus Mr. Lonsdale gives a dubious species from the Wenlock rocks.

Ptilodictya (fossil), Lonsdale.

Thin elongated expansions, having on each surface small quadrangular cells not convex, which penetrate the coral obliquely, and are arranged, with respect to the surface, in longitudinal lines on the middle, and in oblique lines on the sides. Surface a thin calcareous crust. Opening of the cells small, transversely oval. No partition, as in Eschara, between the two layers of cells.

Example, Flustra lanceolata, Goldfuss. ('Pétref.,' tab. 37, f. 2.)

Diastophora (fossil), Lamouroux.

Animals unknown. Cells rather tubular, with rounded opening, disposed irregularly in vertical rows on one face of a lamelliform, irregular, variously expanded polyparium.

Example, Diastopora foliacea, Lamx. From the oolite of Caen.

Ocellaria (fossil), Ramond.

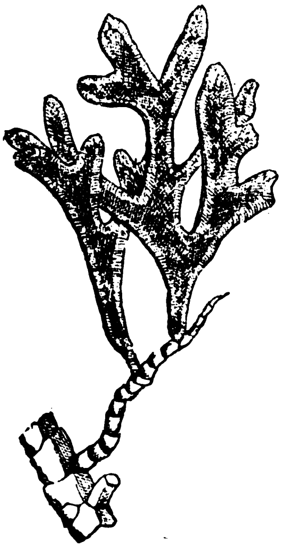
Animals unknown. Cells rounded, elevated in the middle, and united in quincunx on the two faces of a stony, frondescent, variously shaped polyparium.

Example, Ocellaria nuda. From the chalk of Mont Perdu.

Adeona, Lamouroux.

Animals unknown. Cells very small, indistinct externally, with a round, impressed, poriform, operculated opening, closely united quincuncially on the two faces of a foliaceous polyparium connected with an articulated stem.

Example, Adeona foliifera, Lamarck. Blainville, pl. 76, f. 2.



Adeona foliifera.

Mesenteripora, Blainville.

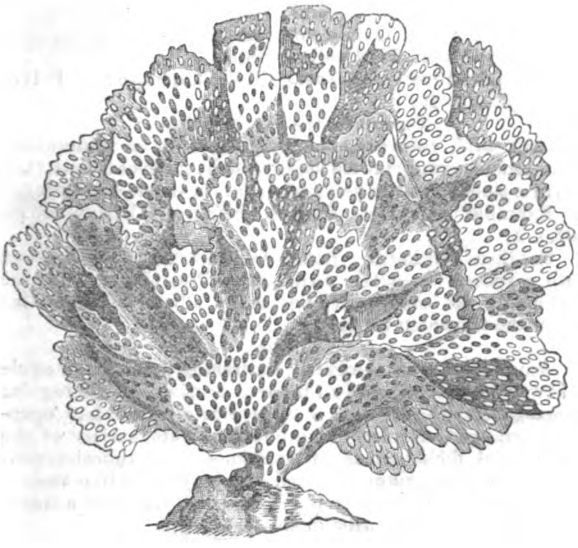
Animals unknown. Cells distinct, oval, oblique, rather prominent, with a subterminal oblique opening; ranged regularly in quincunx in two series, united so as to form a fixed calcareous polyparium, composed of convoluted expansions radiating from the point of attachment.

Example, Mesenteripora scobinula (Eschara of Lamarck). There are fossil species from the oolites of Caen and Bath.

Retepora.

Animals very small, slender, cylindrical, with a circle of simple filiform tentacula. Cells very small, indistinct externally, contiguous, with an oblique (operculated?) opening. The polyparium formed of these cells in one series is a leaf-like expansion, and composed of ramifications which anastomose into a network, and bear the openings of the cells on the inner face only.

Example (recent), Retepora cellulosa. Ellis, 'Corallines,' t. 25, d. D.



Retepora cellulosa.

Whether the fossil species admitted by Lamarck, Blainville, and Defrance, really belong to the genus, we are ignorant; but very many of those referred to this genus by Goldfuss and Phillips, from the carboniferous limestone and older strata, have a most decided analogy to it. Some of them, when of a conical shape (as, if perfect, many are), exhibit the openings of the cells not on the inner but on the outer face. (*Geology of Yorkshire*, vol. ii., pl. 1.) The late Mr. Miller of Bristol proposed (in MS.) for fossils of the same type found in the transition limestone to constitute a new genus, and Mr. Lonsdale, adopting this view and using the convenient name of Fenestella, has given characters for the group. (*Silurian System*, p. 677.) From a careful study of many species of this type, we offer the following abridged generic character:—

Fenestella (fossil), Lonsdale.

Animals unknown. Cells very small, indistinct externally, with small (prominent) openings. The polyparium formed of these cells is a leaf-like (often infundibuliform) expansion, composed of ramifications radiating from a centre, bearing each two rows of openings from the cells on the outer face only, and connected by transverse bars into a reticulated structure.

Example, Fenestella prisca. Lonsdale, 'Silurian System,' pl. 15. From the Wenlock rocks.

The species occur chiefly in the 'upper transition' or Silurian rocks of Shropshire, Dudley, Devonshire, the carboniferous rocks of England and Ireland.

Verticillipora (fossil), Defrance.

Cells poriform, arranged in reticulation on the surface of convex imbricating plates round a hollow axis, so as to form a fixed irregularly subcylindrical polyparium.

Example, Verticillipora cretacea, Defrance. Blainville, t. 66, f. 1. From the chalk.

(To this rather obscurely characterised genus Mr. Lonsdale assigns a species from the Silurian rocks.)

Dactylipora (fossil), Lamarck.

A regular cylindroidal tubular body, rounded at both extremities, with a round orifice at one margined by a fimbriated lip or border; both inner and outer surface reticulated by numerous infundibuliform holes, the partitions between which are pierced by pores supposed to be orifices of the polypiferous cells.

Only one species of this singular and elegant coral (if such it be) is known, viz. D. cylindracea, from the tertiary strata. Blainville, pl. 72, f. 4.

Conipora, Blainville.

An obconical or pyriform hollow body, composed of a thin crust pierced by many quadrangular holes arranged in quincunx.

One species, Conodictyum striatum, Goldfuss (tab. 37, f. 1). From the Jura-kalk of Baireuth.

Ovulites (fossil), Lamarck.

An oviform or cylindrical hollow body perforated at each extremity, and covered by scattered irregular, polygonal, very fine pores.

Lamarck, who constituted the genus, describes two species, O. margaritula, and O. elongata, both from the tertiary strata of Grignon.

Polytrypa (fossil), Defrance.

A subcylindrical fistulous mass, perforated at each extremity, and pitted within and without with round pores (the openings of short cells) very closely set, and arranged in rings, especially on the inner face. (Allied to Dactylipora.)

Example, Polytrypa elongata, Defrance. From the tertiary strata of Valognes. Blainville, pl. 73, f. 1.

Vaginopora (fossil), Defrance.

General form a hollow, external, cylindrical cellular crust, enveloping but not touching an internal hollow tube. The cells of the external crust are hexagonal and united in quincunx, with a small round subcentral orifice; those of the inner tube are elongated and ranged in rings. (It is not unlikely that the union of the two tubes in one specimen is accidental. Only one species, V. fragilis, and of that only a fragment, was known to Defrance, from the tertiary beds of Parnes.)

Larvaria (fossil), Defrance.

A cylindrical, antenniform, fistulous body, composed of celluliform grains arrayed in rings, and leaving between them circular rows of round pores which penetrate through the mass to the interior cavity.

Example, Larvaria reticulata. Defrance, from the tertiary strata of Grignon. Blainville, p. 71, f. 3.

Palmularia (fossil), Defrance.

A fixed oval elongated body, flattened, and smooth on one (probably the lower and adherent) side, and ornamented above and on the sides with two oblique rows of small celluliferous ribs, which denticulate the border.

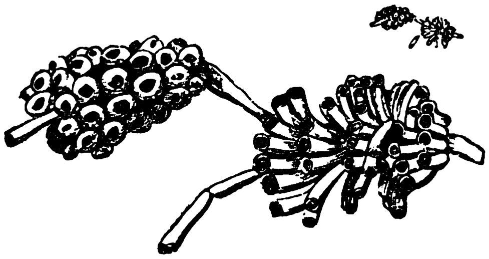
Example, Palmularia Soldani. Defrance, from the tertiary strata of Grignon. Blainville, pl. 68, f. 6.

Concerning the genera Palmularia, Larvaria, Vaginopora, Polytrypa, Ovulites, Conipora, Dactylopora, it is to be remarked that doubts have been expressed as to their really belonging to the Polypiaria at all. The discussions on this subject in Blainville's 'Actinologie' do not entirely clear up the subject.

Cellepora, Lamarck.

Animals provided with eight simple tentacula and two openings to the intestinal canal. Cells complete, circumscribed, urceolated, tumid, with a round operculated terminal opening. The polyparium which they form by their irregular accumulation is of a spongy and porous consistence, and appears either encrusting other bodies or rising into ramose masses like a madrepore.

Example, Cellepora pumicosa, Linn.



Cellepora Pumicosa.

Goldfuss mentions many fossil species, from the antient as well as most recent strata.

Cadosus, Savigny.

Polyparium orbicular, lapidescent, plano-convex, pierced above with central and scattered pores.

Example, Cadosus imbutiformis.

Berenicea, Lamouroux.

Animals unknown. Cells submembranous, prominent, ovoïd, separated, with a round subterminal opening; scattered irregularly or in a radiating manner on the surface of a thin attached crust.

A subdivision of the old genus Cellepora, proposed by Lamouroux.

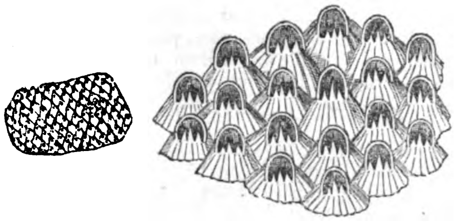
Example, Berenicea diluviana. Fossil from Caen. (Lamx., 'Gen. Polyp.,' tab. 82, f. 1.)

Discopora, Lamarck.

Animals unknown. Cells complete, prominent, more or less with a round terminal operculated opening. The polyparium found by their union in one series is a very small and thin crust.

(A subdivision of Cellepora proposed by Lamarck.)

Example, Discopora verrucosa, Lamarck.



Discopora verrucosa.

Membranipora, Blainville.

Animals hydriform. Cells circumscribed, not prominent, closed above by a thin fugacious membrane in which the round opening is pierced. The polyparium formed by their union is membranaceous, and spreads in a lamina on the surface of marine bodies.

Example, Flustra membranacea of Linnæus.

Blainville states that it is not certain that all the species are operculated. If not operculated, they should be carried to the next great family, and perhaps reunited to Flustra. Several of Goldfuss's fossil Celleporæ are referred to this genus by Blainville.

Fam. 2. *Cellariæa.*

Animals hydriform, separate, distinct, with very fine tentacula. Cells oval, depressed, membranous with a bilateral opening which is not terminal. The polyparium which they form by their union laterally or in two rows, is membranous, and fixed; (ovaria external?) no operculum. The Linnæan genus Cellaria is the type of this family, which ranks with the Zoophyta Ascidioïda of Johnston, and the Ciliobrachiata of Farre.

Genera.

Lunulites (fossil), Lamarck.

Cells in one series arranged in concentric circles on diverging radii, their openings being on one (the upper) surface. Polyparium regular, orbicular, convex above, concave below. (In the typical species the concave side is radiated.)

Example, Lunulites radiata, Lamarck. Blainville, pl. 75, f. 5.

Electra, Lamouroux.

Animals unknown. Cells membranous, vertical, bell-shaped, ciliated on the edges, closed by a membrane like a diaphragm, with a small semilunar opening, and united in a verticillate form round some other body, or in spike-like branches. (Closely allied to Flustra.)

Example, Flustra verticillata, Linn. Lamouroux, 'Polyp. flex.,' pl. 2, f. 2.

Flustra.

Animals provided with numerous simple tentacula, in one row. Cells complete, separate, depressed, with a thick stiff prominent margin, giving attachment to a membranous part, in which is a subterminal transverse opening. Arranged in quincunx, the cells unite to form a membranous flexible encrusting or frondescent polyparium.

This great genus is divided by Blainville into four sections, viz.: —

Encrusting, as Flustra dentata, membranacea, pilosa, &c.

Frondescent, formed of two series of cells, as F. foliacea, F. truncata, &c.

Frondescent, formed of one series of cells, as F. carbasea.

Narrowly lobed, with one series of cells, as F. avicularis, F. setacea, &c.

There are fossil species from the tertiary and perhaps older stratas.

Example, Flustra carbarea. Sol. and Ellis, 'Zooph.,' tab. 3, f. 6, 7.

Admirable figures of Flustra pilosa are given by Mr. Lister, in the 'Phil. Trans.' for 1834.

Elzerina, Lamouroux.

Animals unknown. Cells rather large, elongate oval, subhexagonal with raised margins, which support a membranous expansion, in which a sigmoial aperture appears. By a quincuncial and at the same time circular arrangement of the cells, a branching dichotomous fixed membranous polyparium is formed.

Example, Elzerina, Blainville. From Australasia. Blainville, pl. 80, f. 2.

Pherusa, Lamouroux.

Animals unknown. Cells oval, ending in a large prominent tubular opening, and arranged in oblique rows on only one face of a membranous (or subgelatinous) frondescent, flabelliform, fixed polyparium.

Example, Flustra tubulosa, Ellis. Lamouroux, 'Polyp flex.,' pl. 2, f. 20.

Vincularia (fossil), Defrance.

Cells oval, subhexagonal, regular, with a subterminal semilunar opening; united longitudinally in several rows, they form a slender brittle polyparium (en forme de baguette).

Example, Vincularia fragilis, Defrance. Blainville, pl. 67, f. 3.

Goldfuss, calling the genus Glauconome, describes two other species from the tertiaries of Westphalia, and one (probably not congeneric, but really allied to Fenestella) from the transition strata.

Cellaria.

Animals with an elongated contractile proboscis, a circle of twelve tentacula, and an internal ovarium. Cells regular (hexagonal or oval), with a transverse (subtubular) opening, arranged circularly in quincunx on the surface of the cylindrical dichotomous articulations of a subcalcareous plant-like polyparium, attached by horny tubes like roots.

Section 1, species which have hexagonal cells and a transverse opening (Salicornia of Cuvier).

Example, Cellaria Salicornia. Ellis, 'Corallines,' tab. 23. (Fleming makes it his genus Farcimia.)

Section 2, with oval cells, and tubular opening.

Example, Cellaria ceroïdes. Ellis and Solander, tab. 5, fig. 6, b. c.

Intricaria (fossil), Defrance.

Cells hexagonal, elongated, with a raised border covering all the surface of a rather solid polyparium, formed of cylindrical branches irregularly anastomosed.

Example, Intricaria Bajocensis, Defrance. From the oolite of Bayeux. Blainville, pl. 68, f. 1.

Canda, Lamouroux.

Animals unknown. Cells not prominent, rigid, subcretaceous, arranged in two alternate rows on one face of the branches, which are dichotomous, articulated, united by transverse fibres, so as to form a flabelliform polyparium.

Example, Canda arachnoidea, Lamouroux. (*Zooph.*, pl. 64, f. 19.) From Australia.

Caberea, Lamouroux.

Animals unknown. Cells small. Polyparium calcareous, plant-like, dichotomous, articulated, bearing on one side the cells arranged in quincunx, and on the other the continuation of the fistulous radicles by which it is attached.

Example, Caberea pinnata, Lamouroux. From Australia.

Tricellaria, Fleming.

Animals hydriform. Cells with an oval terminal opening, arranged in three rows on the articulations of the polyparium, which is plant-like, dichotomous, and fixed by radical fibres.

Example, Cellaria ternata, Solander and Ellis. European seas.

Acamarchis, Lamouroux.

Animals unknown. Cells cornuted, adpressed with a vesicle at the orifice, ranged in two lateral rows so as to compose the articulations of a horny plant-like dichotomous polyparium, fixed by radical fibres.

Example, Cellaria neritina, Linn. (Ellis, *Corallines*, t. 19, f. *a*, A, B, C.)

Bicellaria, Blainville.

Animals hydriform, with eight simple tentacula. Cells hardly prominent, arranged in two alternate rows, with their orifices on one face of the polyparium, which is of a cretaceous substance, plant-like, dichotomous, and fixed by radical fibres.

Example, Bicellaria ciliata. Ellis, 'Corallines,' t. 20, No. 5, *d*, D.

Crisia, Lamouroux.

Animals hydriform. Cells ending in a prominent tubular opening, arranged on two alternate rows of articulations of a plant-like dichotomous polyparium fixed by radical fibres.

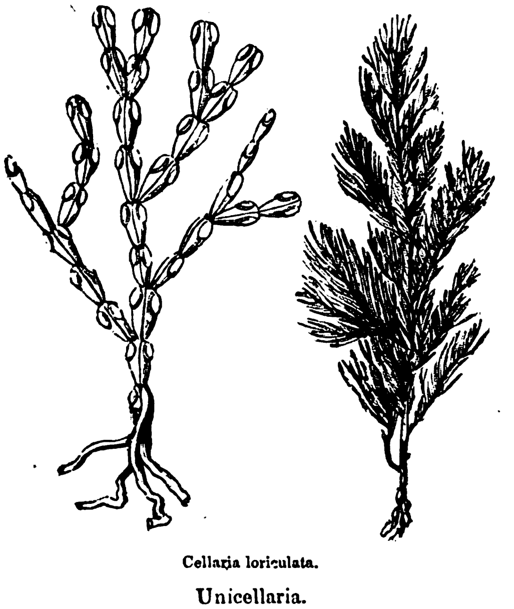
Example, Cellaria eburnea. Ellis, 'Corallines,' t. 21, No. 6, *fig. a*, A.

(This genus of Lamouroux included in that author's arrangement Bicellaria and Tricellaria.)

Gemicellaria, Blainville.

Animals hydriform. Cells oval, with an oblique subterminal opening, united two and two dorsally, so as to form the articulations of a plant-like dichotomous polyparium fixed by radical fibres. (Notamia of Fleming; Gemellaria of Savigny.)

Example, Cellaria loriculata. Ellis, 'Corallines,' t. 21, *fig.* 7, *b*, B



Cellaria loriculata.

Unicellaria.

Animals unknown. Cells elongated, with a terminal opening, forming one by one the articulations of a calcareous plant-like polyparium, fixed by radical fibres. (Eucratea and Lafœa of Lamouroux.)

Example, Unicellaria chelata. Ellis, 'Corallines,' t. 22, No. 9.

Catenicella, Blainville.

Animals unknown. Cells horny, oval, with their openings not terminal, growing one out of another, end to end, or laterally, and spreading over marine bodies in a reticulated or chain-like arrangement. (Hippothöe of Lamouroux?)

Example, Catenicella Savignii. Egypt: see the great work on Egypt ('Description de l'Egypte'). 'Zool. Polyp.,' pl. 13, f. 1.

Menipæa, Lamouroux.

Animals unknown. Cells oval, trifurcate; their orifice rounded, not terminal; arranged in one row on one side, and growing one out of another dichotomously, so as to form the articulations of as ubcalcareous plant-like polyparium, fixed by many radical fibres.

Example, Cellaria cirrhata. Ellis and Solander, t. 4, *fig. d*, D.

Alecto (fossil), Lamouroux.

Cells elongated, tubular, with an oval subterminal orifice, growing one out of another (dichotomously or singly), arranged in one row, and spread in a reticulated form on marine bodies.

Example, Alecto dichotoma, Lamouroux. (*Zooph.*, t. 81, f. 12-14.) From the oolite of Caen.

Fam. 3. *Sertulariæa.*

Animals hydriform, with simple (ciliated?) tentacula and external ovaria. Cells tubular, more or less tooth-like, forming part of a continuous horny subarticulated tube, which is traversed by a soft medullary axis, and fixed by radical tubules.

The Linnæan genera Tubularia and Sertularia constitute this very natural and beautiful family, which is included in the Zoophyta Hydroïda of Johnston, and the Nudibranchiata of Farre. The genera which follow, from Lamarck and Lamouroux chiefly, require much reconsideration.

Section 1. Tubulariæa.

Genera.

Anguinaria, Lamarck.

Animals unknown. Cells subcalcareous, solitary, tubular, or arched, with a large oval oblique subterminal opening, growing irregularly out of a horny anastomosed stem, which spreads on marine bodies. (Aetea of Lamouroux. Mr. Lister wishes it to be placed near Flustra.)

Example, Cellaria anguina, Linn. (Ellis, 'Corallines,' pl. 22, No. 11.)

Aulopora (fossil), Goldfuss.

Cells tubular, with a round opening, more or less projecting, anastomosed so as to form a polyparium, attached to and more or less rampant on marine bodies.

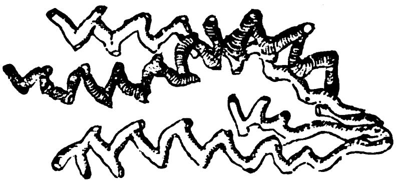
Example, Aulopora serpens, Goldfuss. ('Pétref.,' t. 39, f. 1.) Millepora dichotoma, Linn. From the Eifel limestone.

Mr. Lonsdale and Goldfuss give other species from the same formation in England, in the Eifel, &c., and others of rather different type are mentioned by Goldfuss, from the oolites of Franconia.

Tibiana, Lamarck.

Animals unknown. Cells cylindrical, tubular, united into an angularly bent tube, on the projecting angles of which are situated the round openings of the cells. The tubes are fasciculated, and reunited to a base fixed by radicles.

Example, Tibiana fasciculata, Lamouroux. ('Polyp. flex.,' pl. 7, *fig.* 3, *a*.)



Tibiana fasciculata.

Tubularia, Pallas.

Animals bearing a sort of proboscis projecting from the centre of a circle of ciliated tentacula. Cells infundibuliform, placed at the extremity of long horny simple or bifurcated tubes, which form by their assemblage a rooted polyparium. (Much allied to Campanularia.)

Examples, Tubularia indivisa. (Ellis, 'Corall.,' t. 16, f. *c*.) Tubularia ramosa. (Ellis, 'Corall.,' t. 17, f. *a*.)

Coryna, Gærtner.

Animals club-shaped: the upper oval part being covered with slender tentacula ending in suckers, and supported by a long simple or branched vertical attached stem. (Linnæus ranked them with Tubularia (a confused genus in his arrangement); Müller with Hydra, and Lamarck places Coryna near Hydra, giving further to it the character of a terminal mouth.)

Example, Coryna squamata, Pallas.

Here come the genera Corynomorpha of M. Sars, Syncoryna of Ehrenberg, and Pedicellina of Sars. In the latter both the mouth and anal orifice are at the upper extremity of the oval expansion.

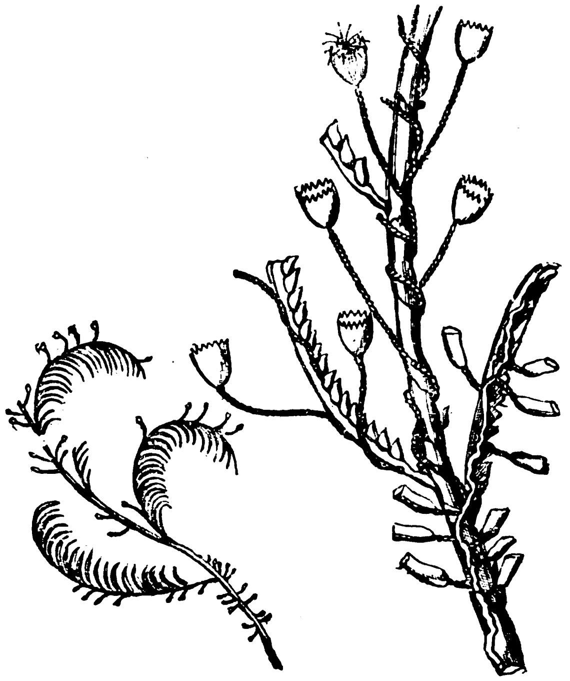
Section 2. Sertulariæa. (Genus Sertularia of Linn.)

Campanularia, Lamarck; Clytia, Lamouroux.

Animals bearing a simple circle of ciliated tentacula. Cells urceolated, pedunculated, attached along a common filiform, branching, twisting, or climbing axis.

Div. 1. Axis climbing.

Example, Campanularia volubilis. (Ellis, 'Corallines,' t. 14, *fig. a*, A.)



Campanularia volubilis.

Div. 2. Axis not climbing.

Example, Campanularia rugosa. (Ellis, 'Corallines,' t. 15, *fig.* 23.)

Laomedea, Lamouroux; part of Campanularia, Lamarck.

Animals with twelve ciliated tentacula. Cells pedunculated, scattered on the branches of a plant-like polyparium, fixed by radical fibres.

A. Stem simple; cells scattered.

Example, Laomedea fruticosa, Esper. ('Zooph.,' t. 34, *fig.* 1, 2.)

B. Stem simple; with alternate cells.

Example, Sertularia dichotoma, Linn. (Ellis, 'Corall.,' t. 12, *fig. a, c.*)

C. Stem complex; cells scattered.

Example, Laomedea dumosa, Johnston. (Ed. *Ph. Journal*, xiii., t. 3, f. 2, 3.)

D. Stem complex; cells alternate.

Example, Sertularia gelatinosa, Linn. (Ellis, 'Corall.,' t. 12, *fig. c, c.*)

E. Stem complex; cells verticillate.

Example, Sertularia verticillata, Linn. (Ellis, 'Corall.,' t. 13, *fig. a*, A.)

Vesicularia spinosa, Thompson. Valkeria spinosa, Fleming, is arranged in this latter subdivision by Blainville. (See Dr. Farre's drawings of this species in 'Phil. Trans.,' for 1837.)

Serialaria, Lamarck; Amathia, Lamouroux.

Animals unknown. Cells very distinct, conical, almost tubular, placed in series on one side of the articulations of the fistulous branched and fixed polyparium.

A. Cells grouped.

Example, Serialaria lendigera. (Ellis, 'Corall.,' t. 5, No. 24.) Europe.

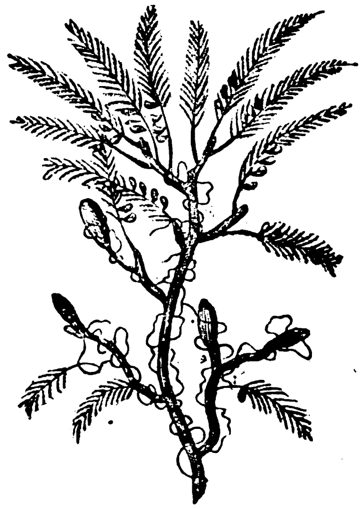
B. Cells in a spiral.

Example, Serialaria spiralis, Lam. Australia.

Plumularia, Lamarck; Aglaophenia, Lam.

Animals with 15-18 ciliated tentacula. Cells very distinct, axillary, arranged on one side of the small branches of a fistulous articulated penniform polyparium, which is fixed by many tubular radical fibres.

Example, Sertularia pluma, Linn. (Ellis, 'Corall.,' t. 7, No. 12.)



Sertularia pluma.

Dr. Fleming proposes to divide this large and beautiful genus into two groups, according as the stems are simple (as in the above species), or compound, as in Plumularia myriophyllum. The works of Ellis, Lamouroux, and Dr. Johnston may be consulted for the drawings of the species, of which several are British.

Sertularia, Lamarck.

Animals having ciliated tentacula. Cells sessile, urceolate, arranged alternately or in pairs obliquely (not exactly opposite) on the stem and branches of the polyparium, which is horny, fistulous, generally bent in zigzag, and attached by radical fibres.

Thus circumscribed and reduced to a mere fragment of the great Linnæan genus, Sertularia still includes many species from the European and Australian seas.

Example, Sertularia Polyzonias, Linnæus. Ellis, 'Corallines,' pl. 2, No. 3.

Biseriaria, Blainville; Thujaria, Fleming.

Animals unknown. Cells turbinated, sessile, not prominent, touching and placed in two rows along the ramifications of the horny plant-like polyparium, which is fixed by radical fibres.

Example, Sertularia Thuja, Linnæus. Ellis, 'Corallines,' pl. 5, No. 9.

Idia, Lamouroux.

Animals unknown. Cells oval, rather recurved, closely ranged on two alternate rows, and projecting on the sides of the branches (themselves alternating) of a plant-like fixed polyparium.

Example, Idia pristis, Lamouroux. 'Polyp. flex.,' pl. 5. Australia.

Tuliparia, Lamarck; Pasythea, Lamouroux.

Animals unknown. Cells arranged in pairs and small groups in each articulation of the polyparium, which is connected to a repent stem.

Examples, Sertularia tulipifera, Gmelin (cells pedunculated); Sertularia quadridentata, Gmelin (cells sessile).

Antennularia, Lamarck; Nemertesia, Lamouroux.

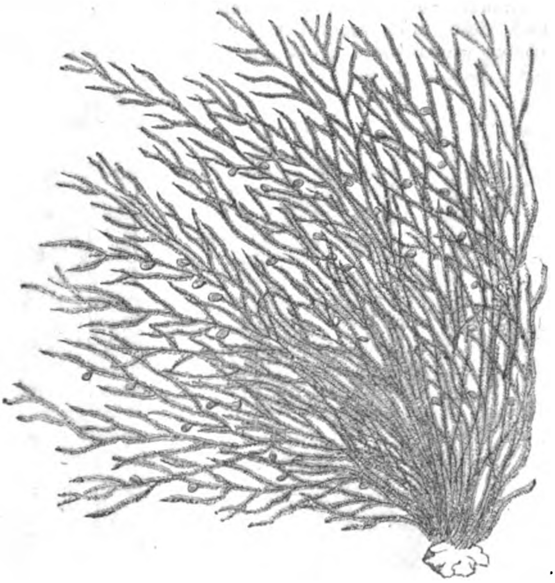
Animals with eight tentacula. Cells minute, indistinct, opening on the inside of ciliated articulations, which are arranged in whorls round a fistulous horny stem rising from root-like fibres.

Example, Antennularia indivisa. Ellis, 'Corall.,' pl. 9, a.

Dynamena, Lamouroux.

Animals with twelve simple tentacula. Cells urceolate, or tooth-like, sessile, arranged in pairs (regularly opposite) and prominent along the branches and stem of a horny, articulated, plant-like, fistulous polyparium, which is attached by creeping radical fibres.

Example, Dynamena operculata. Ellis, 'Corallines,' pl. 3, No. 6.



Dynamena operculata.

This genus, rich in British species, is separated from Sertularia by convenient rather than by important distinctions.

Cymodocea, Lamouroux.

Animals unknown. Cells filiform, lengthened, regularly opposed two and two, and transversely, on horny fistulous stems, which are attached by a broad thin base.

Example, C. ramosa, Lamouroux. 'Polyp. flex.,' tab. 7, f. 1. West Indies.

Salacia, Lamouroux.

Animals unknown. Cells dentiform, minute, oval, verticillate four and four, along the tubular branches of a horny plant-like fixed polyparium.

Example, Salacia tetracythara, Lamouroux. 'Polyp. flex.,' tab. 6, pl. 3. Australia.

Thoa, Lamouroux.

Animals elongated, having twelve simple tentacula, and mostly projecting beyond the cells. Cells dentiform, minute, indistinct, alternate on the sides of the compressed branches of a horny stem formed of interlacing tubes, the lower ones root-like.

Example, Sertularia balecina, Gmelin, Fleming.

Entalophora (fossil), Lamouroux.

Cells elongate, dentiform, recurved, with a round terminal opening, scattered on a plant-like, slightly ramose, fixed polyparium.

Example, E. cellarioides, Lamouroux. 'Gen. Polyp.,' tab. 80, f. 9. Caen.

POLYPIARIA DUBIA.

Genera.

Cristatella, Cuvier.

Animals short, growing irregularly from a common unattached basis. Many ciliated tentacular cirri, arranged anteriorly in a lunate or horseshoe form, with the mouth in the middle of the branches. A median opening at the base of the dorsal region.

Example, Cristatella vagans, Cuvier. Blainv., pl. 85, f. 7.

Alcyonella, Lamarck.

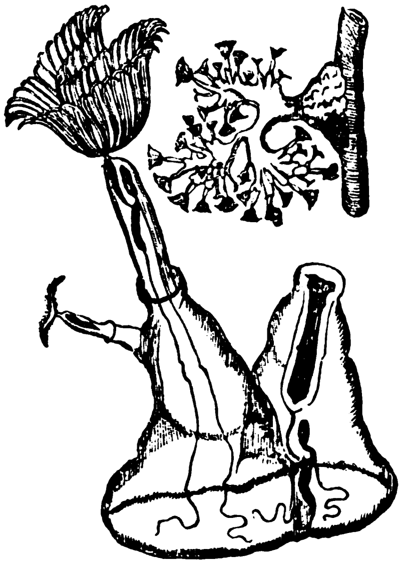
Animals hydriform, retractile into a fixed suberose polyparium, composed of vertical subpentagonal tubes full of granular corpuscles. Many tentacula arranged in a horseshoe figure.

Example, Alcyonella stagnorum, Lamarck, Blainville, pl. 85, f. 8.

Plumatella, Bosc; Naisa, Lamouroux.

Animals short, capable of retraction, projecting from a sort of rampant attached thallus. Two fasciculi of unequal tentacular cirri, forming a horseshoe figure, in the midst of which is the mouth.

Example, Plumatella cristata, Lamarck. 'Polype à panache,' Trembley, pl. 10, f. 8, 9.



Plumatella cristata

Difflugia, Leclerc, Lamarck.

Body small, gelatinous, contractile, enclosed in a sheath of an oval subspiral figure, extended into a straight termination and covered with arenaceous grains. Tentacula unequal, retractile.

Example, Difflugia proteiformis, Lamarck. Blainville, pl. 85, f. 5.

It is perhaps still uncertain what may be the exact relation between the four genera of fresh-water Polypiaria just enumerated. The strong analogy between them is admitted by all modern writers, and M. Raspail, in Memoirs read to the Academy of Sciences, has endeavoured to prove that they are all one and the same animal in unequal states of development, a proposition since controverted on good grounds by M. de Gervais, Mayer, Ehrenberg, &c.

Dædalæa (marine), Quoy and Gaimard.

Body ovoid, glandiform, with long simple subradiating tentacula. Cells of the same form, transparent, attached in irregular groups on a cylindrical axis of gelatinous or membranous substance, which bifurcates or trifurcates and anastomoses into an irregular unattached reticulation.

Example, Dædalæa mauritiana, Quoy and Gaimard. Blainville, pl. 81, f. 6.

POLYPIARIA NUDA.

Under this division, only the genus Hydra (which see) is retained by Blainville. Lamarck included Hydra, Coryna, Pedicellaria, Zoanthus. Regarding Pedicellaria, which is attached to the shells of Echini, it is perhaps a part of the Echinodermatous structure. Coryna is included in Polyp. membranacea. Zoanthus is closely related to Actinia.

POLYPIARIA CORTICIFERA.

Lamarck has grouped under this title a family of Polypiaria for the most part very natural. Ramified into an arborescent form from a fixed base; composed of two separate parts, an external living fleshy envelope bearing and containing polypi, and an internal firm solid inorganic axis; these corticiferous Polypiaria, as Lamouroux also calls them, are in general easily recognised. Lamarck gives only six genera, viz. Corallium, Melitæa, Isis, Antipathes, Gorgonia, Corallina. (Whether the latter should be ranked with plants, as many moderns think, or compose a separate group of Zoophyta (Calciferous Corallines of Lamouroux) is uncertain; they are not rightly placed with corticiferous Polypiaria).

Lamouroux omits from the group Corallinæ, to constitute a separate section, but introduces rather awkwardly the group of Spongiæ. Augmenting Lamarck's genera, he gives of true Corticifera eleven types, viz. Anadyomena, Antipathes, Gorgonia, Plexaura, Eunicea, Muricea, Primnoa, Corallium, Melitæa, Mopsea, Isis. (*Exposition des Polypiers.*)

Cuvier, taking a different view of the bounds of the group, notices the interior conformation of the animals, whereby they approach to Actinia, and adopts the following classification:—

Polypiaria corticifera—1. Ceratophyta with a horny axis.
    Antipathes.
    Gorgonia—Plexaura, Eunicea, Muricea, Primnoa.
    2. Lithophyta with stony axis.
    Corallium, Melitæa, Isis, Mopsea.
    (Madrepora, &c. &c.
    Millepora, &c.) These are quite misplaced.
    3. Natantia.
    Pennatula, &c.
    4. Alcyonea.
    Alcyonium, Tethya, Spongia.

Dr. Johnston, in his valuable work on British Zoophytes (1836), has arranged them very conveniently in the order of *Asteroïda.*

Blainville places the Corticifera in his class of Zoophytaria, which includes the families—1, Tubiferæa; 2, Corallia; 3, Pennatularia; 4, Alcyonaria or Sarcoidea.

The family of *Corallia* exactly corresponds to Polypiaria corticifera of Lamarck properly limited. The Alcyonaria are equivalent to Lamarck's Polypi tubiferi, with Alcyonium added, as Latreille has very properly done (*Familles Naturelles,* p. 543). We shall supply under the title SARCOIDEA what is required in addition to the article Alcyonium. PENNATULARIA and TUBIFERÆA form separate articles, and some general observations may be added under ZOOPHYTARIA.

The Corallia, or true corticiferous Polypiaria, are thus explained by Blainville:—

Animals hydriform, with internal ovaria, and eight (pinnated?) tentacula irregularly scattered on the surface of a compound polyparium, formed externally of a living gelatinoso-cretaceous substance, and internally of a solid horny or calcareous axis, concentrically laminated. The base of attachment is large.

Genera.

Corallium, Lamarck.

Cells immersed in a *thin* external fleshy integument; axis thick, stony, solid, striated, ramified, and fixed by a broad base.

Example, Corallium rubrum (Gorgonia nobilis, Linn.). Ellis and Solander, pl. 13, fig. 3, 4.

This, the only species, is the common red coral of the Mediterranean.

Mopsea.

Animals with eight ranulose tentacula. Cells immersed in the integument. Axis stony, articulated, the articulations ramified, and separated by horny intervals giving origin to branches.

Example, Mopsea dichotoma (Isis, auct.).

Melitæa, Lamouroux.

Animals unknown, scattered in a soft, fleshy, thin integument. Axis arborescent, ramified, composed of stony substriated articulations, separated by spongy tumid intervals. (Colour red.)

Example, Melitæa coccinea. Sol. and Ellis, tab. 12, f. 5.

Gorgonia.

Animals with eight ovarian orifices; cells scattered in a thin integument; axis plant-like, solid, of a horny substance, fixed by a wide base.

A. Cells not prominent.

Example, Gorgonia patula. Ellis and Solander, tab. 15, fig. 3, 4.

B. Cells prominent, pustulous.

Example, Gorgonia flabellum. Ellis, 'Corall.,' tab. 26, fig. A.

C. Cells prominent, recurved.

Example, Gorgonia florida. Muller, 'Zool. Dan.,' t. 137.

The fossil species from transition strata, referred to this genus by Goldfuss, are mostly transferred to Retepora and Fenestella.

Eunicea, Lamouroux.

Animals with short tentacula. Cells mammillated, dispersed or ranged in lines on the surface of the branches. External integument thick, cylindrical; axis horny. (This genus is not adopted by Lamarck.)

Example, Eunicea mammosa, Lamarck. 'Polyp. flex.,' pl. 17.

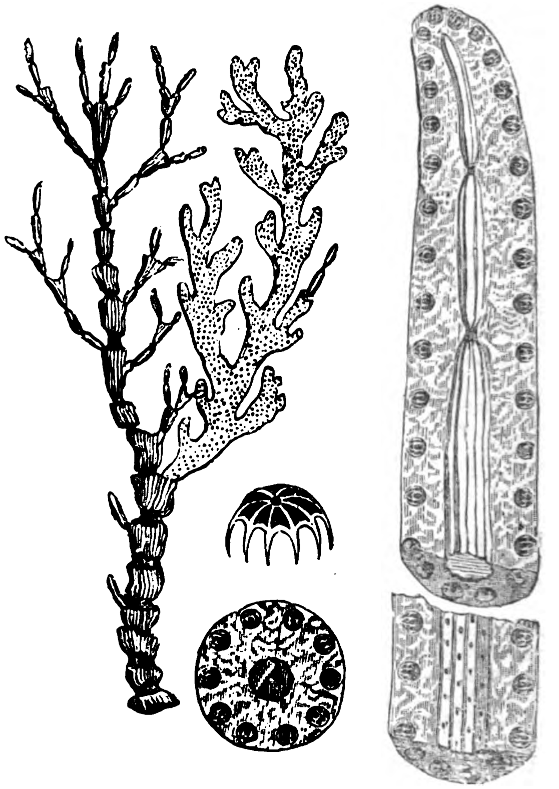
Funicula, Lamarck.

Animals papilliform, ranged in lines alternately on each side along a very slender body, composed of a thin integument and a horny axis. (Lamarck placed the genus among the Pennatularia.)

Example, Funiculina cylindrica, Lamarck. Blainville, pl. 90, f. 4.

Isis.

Animals very small, abundantly scattered in the soft thick fleshy integument. Axis arborescent, composed of striated calcareous articulations separated by horny intervals. Base attached.



Isis hippuris.

Example, Isis hippuris, Linn. Ellis and Solander, 'Zooph.,' tab. 3, fig. 1-5.

There are a few fossil species from tertiary strata.

Plexaura, Lamouroux.

Cells not prominent, immersed in a very thick integument, of a substance like cork when dried; axis arborescent, often dichotomous, horny, fixed.

Example, Plexaura suberosa. Ellis, 'Corall.,' tab. 26, P, Q, R.

Muricea.

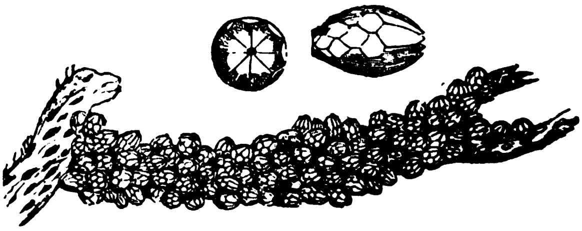
Animals forming prominent zonical mammillæ of a squamose and tubular structure, scattered on the surface of the subdistichous branches of a plant-like polyparium. Integument thick, axis horny and cylindrical except at the origin of the branches.

Example, Muricea muricata, Lamouroux. 'Expos. Méthod.,' tab. 71.

Primnoa, Lamouroux.

Animals forming prominent elongated mammillæ of a squamose structure; polyparium dendroidal, dichotomous; integument thin; axis horny and very hard.

Example, Gorgonia lepadifera, Linn. Blainville, pl. 87. From Norway.



Gorgonia lepadifera.

Antipathes, Pallas.

Animals scattered in a thick gelatinous integument which falls off on drying); polyparium horny, flexible, solid, often spinose, branched. Pallas says there are external turbinated ovaria. Mr. Gray assigns to them six tentacula.

Example, Antipathes ulex. Ellis and Solander, tab. 19, f. 7, 8.

Cirripathes, Blainville.

Animals very small, with six wrinkled tentacula (not pinnated?) immersed in a thin gelatinous integument; axis horny, simplé, fistulous; polyparium conical, elongated, cirriform, with rows of spines. Mouth projecting and lobed.

Example, Antipathes spiralis, Linn. Ellis and Solander, tab. 19, fig. 1-6.

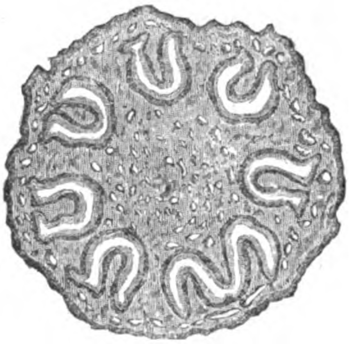
POLYPLAXI'PHORA. [CHITONS.]

POLYPLECTRON. [PAVONIDÆ, vol. xvii., p. 337.]

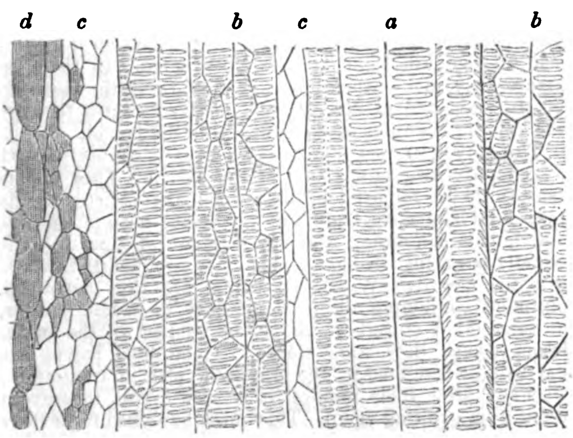
POLYPODIA'CEÆ are one of the chief divisions of the natural order of ferns, and may be conveniently taken as the type of the whole. They constitute the highest form of Acrogenous or Cryptogamic vegetation, and are regarded as approaching more nearly to Cycadaceous Gymnosperms than to any other part of the vegetable kingdom now in existence.

They are usually herbaceous plants, with a permanent stem, which either remains buried and rooting beneath the soil, or creeps over the stems of trees, or forms a scarcely moveable point of growth round which new leaves are annually produced in a circle, or it rises into the air in the form of a simple stem, bearing a tuft of leaves at its apex, and sometimes attaining the height of fifty or sixty feet.

The interior of the stem consists of a centre of cellular substance, which often disappears, and among which bundles of fibro-vascular tissue are sometimes mixed; beyond the cellular centre lies a zone of woody hard plates, which are much folded and plaited, which communicate with the petioles of the leaves, and which commonly present a horseshoe appearance when cut across; each of the woody plates is soft in the interior, where the texture principally consists of scalariform and pitted vessels and cells, as is seen in the accompanying figure of a highly magnified slice of *Cyathea Schanschin*, where *d* represents a portion of the hard coloured cells that constitute the wood, properly so called, *c* loose cells, *a* scalariform vessels, and *b* pitted tissue.



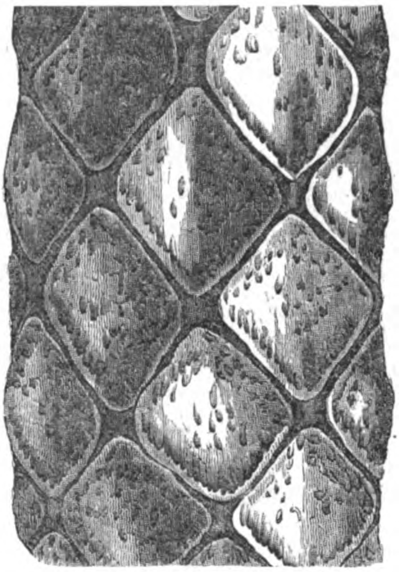
Section of stem of Alsophila vestita.



The whole of these parts are covered over with a hard cellular integument, which stands in the room of bark, and which is in reality a merely hardened portion of the general cellular tissue of the trunk.

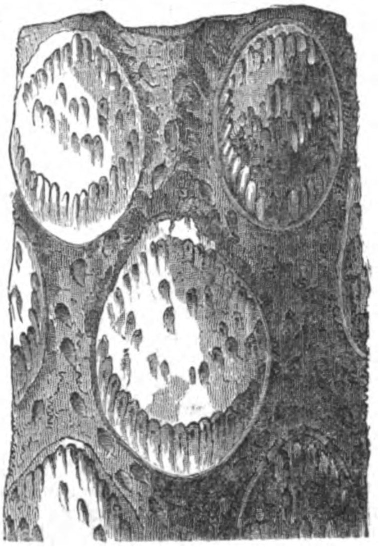
The stems seem always to produce roots in great quantities from their surface, even when elevated in the air; such roots are more especially met with near and under the ground, where they form a stratum of some thickness, acting both as feeding organs and as an external protection; on all Tree-ferns they appear upon the stem at least in the form of tubercles; and in *Cibotium Billardieri* they cover over the whole surface from the top to the bottom with a dense layer several inches deep.

The surface of Tree-fern stems may be taken to represent that of the order in general. It is always marked with scars of considerable size, having either a lozenge form or that of an irregular oval, and bearing within their area evident traces of the fracture of woody plates which passed from the stem into the leaves.



Portion of stem of Chnoophora excelsa.

These scars lengthen as the stem increases in age, till the lozenge or oval form is entirely destroyed; the scars then become separated to considerable distances, and extended into long and often irregular and indefinite spaces separated by deep furrows. Hence it happens that the appearance of the upper and lower end of the same tree-fern stem is so dissimilar, that they would not be supposed to belong to even the same species. Below the scars, or interposed among them, are found openings down into the interior of the stem, filled with pulverulent matter, and of unknown use. They appear to be of the same nature as the apertures into the superficial cells of Sphagnum, or more especially as the perforations in the rhizoma of Nymphæa. The next figure shows the appearance of such apertures in *Alsophila vestita*.



Although tree-ferns are unknown in any countries except those having either a damp tropical climate, or at least an equable mild temperature and humid atmosphere, yet the common ferns of this country, whose stems, vulgarly called roots, are formed under ground, exhibit the same kind of organization as that just described, only in a less conspicuous manner. It does not therefore follow that the remains of tree-ferns found in this country in a fossil state prove Great Britain to have had formerly a tropical climate, especially as the number of such remains hitherto met with has been extremely small; the utmost value that can be assigned to their evidence is that of probability. In those tropical lands where the tree-fern acquires its full size, as for example Brazil, the Philippines, Pitcairn's Island, &c., it becomes one of the most majestic and graceful objects, having an enormous plume of the most delicate and verdant foliage at the extremity of a lofty flexible stem, which sways beneath the gentlest breeze.

Chnoophora excelsa.

The leaves of ferns, called their fronds by Linnæus, are inserted upon the stem by an angular base, which is never extended at the sides into a sheath, as in palms; they are often of very considerable size, and cut into a multitude of divisions by repeated pinnation—this is especially the case with those of tree-ferns. The leaves are however often very small, and undivided. They are penetrated by veins, which are either simple or divided in a forked manner; many instances of netted leaves are however known, more especially in the genus *Hemionitis*. Their surface is provided with stomates, or breathing pores.

The fructification of ferns consists of hollow cases, called *sporangia*, generated upon the surface of the under side of the leaves, or below its epidermis, which latter is then ruptured in a definite manner, and the portion so divided from the rest is called the *indusium*. Each sporangium contains a number of granular particles, or spores, by means of which the fern is multiplied. There are no traces of sexual organs; for although Hedwig and others have fancied that they found male organs in various parts of the back of the leaves of ferns, such observations do not at all agree with each other, and have met with but little credit. The most common opinion is that certain small bodies of a cellular transparent texture, found among the sporangia when very young, are really stamens; but althought he existence of such organs is well known, there is not the smallest evidence of their possessing the attributes of a stamen.

The number of ferns known to botanists is considerable, and their classification has been found a subject of great difficulty. It has been attempted, with various degrees of success, by Swartz, Smith, Kaulfuss, A. Brongniart, Schott, and others; the most recent and apparently the best classification is that of Presl, published under the name of *Tentamen Pteridographiæ*, at Prague, in 1836. See also Mohl, *De Structura Filicum;* A. Brongniart, *Histoire des Végétaux fossiles*, i. 392; and Endlicher, *Genera Plantarum*, p. 58.

PO'LYPUS is a morbid growth attached to the interior of one or other of the mucous canals, by a more or less narrow pedicle. Polypi occur most frequently near the orifices of external communication of the mucous canals, as in the uterus, the fauces, the larynx, and the nose. A description of those that grow in the last of these situations may serve for all.

Polypi of the nose are of four kinds, which are named respectively, vesicular, gelatinous, fibrous, and malignant. Vesicular polypi are grey or yellowish transparent vesicles, containing a clear watery fluid with a little mucus; they are very soft, easily break down when they are pressed, and are liable to considerable increase of size when the evaporation from them is decreased in damp weather. They appear to consist of enlarged mucous follicles. Gelatinous polypi are more solid growths, consisting of dull white masses attached to the mucous membrane of the nose, and themselves covered by a fine but rather tough membrane. They seem composed of an excessive growth of the mucous membrane infiltrated with fluid, and having a few fibres running through its substance. Fibrous polypi are still more solid growths; they consist of a dense fibrous and vascular tissue, which it is often difficult to cut through, and which is sometimes converted into bone. They are usually intimately connected with the deeper parts of the mucous membrane. Malignant polypi are growths of a cancerous nature from the mucous membrane, which have received the name of polypi rather from having the same situation as the preceding than from their similarity of form. They may assume the characters of simple or scirrhous cancer, but more commonly they have those of the soft or medullary variety [CANCER] which is frequently called fungus hæmatodes.

The common symptoms of all polypi of the nose are that the patient is unable to breathe through the nostril in which they are placed, and has a nasal voice; there is usually a discharge of watery mucus, a loss of smell, and a diminution of the power of taste. If situated far back in the nose, they may cause deafness or obstruct the swallowing of food. They even render the breathing difficult. The softer kinds seldom produce worse effects than these, for their growth is restrained by the firm tissues of the nostrils; but the two last and firm varieties will continue to increase, expanding the bones and other tissues of the nostrils and face into huge and hideous swellings, and producing death either by their ulceration, or by their pressure on the vessels of the brain, or on the brain itself through the base of the skull.

The most usual situation of polypi is in the upper and back parts of the nostrils; and almost always on the outer wall, the septum being very rarely affected. In their increase they mould themselves to the form of the passages of the nose, and at last protrude either forwards through the anterior openings or backwards into the fauces.

The growth of vesicular polypi is usually connected with a generally disordered state of the health. They seldom require to be removed by operation; the patient should take mild alterative and tonic medicines with purgatives, and lotions containing alum or sulphate of zinc, or some equally powerful astringent, should be frequently injected into the nostrils. When the polypi are thus destroyed, ointment containing nitrate of mercury, or savine powder, or some other stimulant, should be rubbed on the membrane where they were seated. Gelatinous polypi are not usually benefited by the preceding plan of treatment; although after their removal it is very useful to prevent them from growing again. They must be pulled from their attachment by forceps, which should have rough blades, and, if possible, be placed around the pedicle of the growth, and withdrawn with a kind of twisting motion. All the polypi being thus removed, the mucus membrane should have some powerfully astringent lotion or ointment applied to it. The fibrous polypi usually require a more difficult operation for their removal; when they can be withdrawn by the forceps, it is only with much difficulty, from their being seated far back in the nostrils, and with some violence and danger of hemorrhage. In some cases a ligature may be tied round the base of such a polypus so as to make it slough off; in others they must be cut out with the knife or scissars. The choice of these operations must be made according to the circumstances of each case. After their removal, the same means should be adopted to prevent their return as in the preceding cases. The malignant growths in the nose, like those in other parts of the body, where their early and complete removal cannot certainly be accomplished, had better be treated only by palliative measures.

POLYSTOMELLA. [FORAMINIFERA, vol. x., p. 348.]

POLYTHALAMA'CEA. Under the title of CEPHALOPODA will be found notices of the principal modes of classification adopted for the numerous fossil and few recent testaceous bodies allied to Nautilus, Spirula, and Sepia. Many of the genera of this great division of molluscous animals are also noticed in their appropriate places, as BACULITES, BELEMNITES, BELLEROPHON, CORNU AMMONIS, GONIATITES, and, above all, NAUTILUS, by the investigation of which, in a living state, Professor Owen has been enabled to clear away much of the obscurity which overhung the history and affinities of fossil Cephalopoda.

It is proposed to sketch in this article a brief outline of the state and progress of investigation into the affinities and geological distribution of the leading groups of the Polythalamaceous Cephalopods, which may be ranked in the following four families, viz.:—

Tetrabranchiata. Fam. 1. Nautilidæ.
2. Ammonitidæ.
Dibranchiata. Fam. 1. Spirulidæ.
2. Belemnitidæ.

So large a proportion of the components of these families are in a fossil state, that it is necessary to base a view of their relations on the conservable testaceous parts principally, always however keeping in mind the probable uses of the parts, as determined by investigation of the recent forms most nearly comparable.

Nautilidæ.

Three principal considerations have guided the geological naturalists, to whom principally the divisions of the Nautiloidal Cephalopoda are due, in the arrangements which they have proposed:—

1. The spirality of the shell. In Nautilus it is involute or convolute; in Orthoceras straight; and between perfect involution and absolute straightness, we have every degree of curvature.

2. The form in which the septa, whereby the cavity becomes concamerated, meet the inner surface of the shell. In most Nautili this is a gentle and simple curve; in many Orthocerata it is waved; in many Clymeniæ undulated, or deeply and angularly notched.

3. The situation of the siphuncle on the disk of the septa. In most Nautili the siphuncle is nearly in the centre of the disk; in Clymeniæ it is on or near the inner or ventral edge; in Cyrtoceras generally near to the outer or dorsal line.

To these Mr. C. Stokes (*Geol. Proceedings*) has added, in the case of the Orthocerata, the consideration of the form of the siphuncle itself; and Mr. Broderip (*Silurian Researches*) has noticed, in the character of Phragmoceras, the form of the aperture and last chamber.

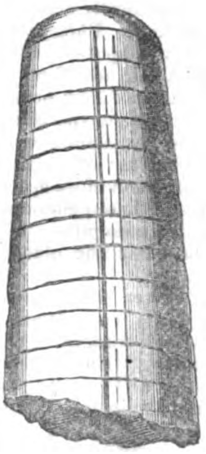
It is difficult to be satisfied, while attempting the arrangement of Nautiloidal Polythalamacea, with following out to its remote consequences any one of these principles exclusively. From the general figure we derive three main groups, viz.:—

A. Orthocerata, &c. Straight.
B. Cyrtocerata, &c. Incurved or convoluted near the apex, ending in a straight or recurved limb.
C. Nautili, &c. Altogether convoluted.

A. To subdivide these groups, we may take in Orthocerata not the septal edge, but the siphuncular structure; and, with Mr. Stokes, separate Ormoceras, because of its tumid interruptal siphuncle; and with Bronn, Actinoceras, because of its radiating siphuncular processes.* Species of Ormoceras belong to the upper Palæozoic strata generally, viz. to the upper Silurian rocks of Murchison, the Devonian and carboniferous systems in Europe and North America, above which they are unknown. Actinocerata have the same or a more limited range. Orthoceratites proper (excluding curved species, like O. paradoxicum, Sow.) have the same geological range, and exhibit so great variation in the form of the cone, the disposition of the septa, and situation of the siphuncle, as to furnish many helps to recognise the otherwise undistinguishable forms of the numerous species which fill the older rocks.

For example, the cone is nearly a circular base, the septa are transverse, and the siphuncle is nearly central in O. giganteum and O. cinctum of the mountain limestone; the cone has an elliptic base, oblique septa, and an excentric siphuncle in O. laterale, O. Breynii of the mountain limestone, and O. imbricatum of the Ludlow rocks.

The last chamber and the mouth also vary in form. In one species from the Ludlow rocks the form of these parts has suggested to Mr. Sowerby the generic name of Gomphoceras (*Silurian Researches*); and another, from the mountain limestone, has received the specific designation O. fusiforme.



Orthoceras laterale.

It may be remarked that the cases are few in which the apex of Orthocerata has been actually observed; in several cases of supposed straight shells, the apicial part is seen to be curved; and it is our conviction that this is very much more common than the heedless application of Orthoceras would lead to suppose.

We have not mentioned in this review the Conulariæ of Miller, as being, though probably of this family, not sufficiently known. The following abbreviated characters may be useful to the geological student:—

Orthoceras (ὀρθός, straight, combined with κέρας, a horn), Breynius, a straight concamerated shell, with septa regularly concave toward the mouth, perforated by a simple nearly cylindrical siphuncle, either in or not far removed from the centre of the disk (never marginal).

α. Last chambers cylindrical, as O. giganteum.
β. Last chamber contracted toward the aperture, as O. fusiforme.

Ormoceras (ὅρμος, a bead, combined with κέρας), Stokes, a straight concamerated shell, with septa as in Orthoceras, perforated by a siphuncle similarly situated, but much dilated in each chamber, and contracted at the parts where the septa are attached to it. The inner part of the siphuncle is divided into chambers, corresponding in number with the chambers, and deeply indented in the middle, where the septa of the shell are attached to them; so that one-half of each division of the siphuncle is in one chamber, and the other half in the next chamber.

The typical species are from Drummond Island, in Lake Huron. (Stokes, in *Geol. Proceedings*, 1838, and *Transactions*, 1840.)

Actinoceras (ἀκτίν, a ray, combined with κέρας), Stokes, a straight conical concamerated shell, with septa as in Orthoceras, and siphuncle shaped, as to its external face, as in Ormoceras. Within the siphuncle is a continuous tube, which appears to have been capable of expansion and contraction, and is furnished with verticillate radii, which connect the tube with the walls of the siphon. (Stokes, in

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* 'Geological Proceedings,' 1838.

Geol. Proc., 1838, and *Transactions*, 1840; and Bronn, *Lethæa Geogn.*, tab. i., *fig.* 8.)

The species are from Lake Huron and other parts in Northern America, and Castle Espie in Ireland.

(The genus Conoceras of Bronn is included in Actinoceras by Mr. Stokes.)

Conularia, Miller, a straight (or slightly bent?) pyramidal four-sided (concamerated?) shell.

Conularia quadrisulcata is a common shell in what were called transition rocks in Sweden, Wenlock, Dudley, &c.; and a similar if not identical species occurs in the carboniferous rocks of Coalbrook-dale and Rutherglen.

(Sowerby, in the *Mineral Conchology of Great Britain*; and Murchison, in *Silurian Researches*.)

B. In classing the bent or partially convoluted polythalamacea, we may find advantage in attending to the situation of the siphuncle. For example, the siphuncle is subdorsal or approaches the outer line of curvature in Cyrtoceras, Goldfuss, and Gyroceras, Meyer; it is subcentral in Lituites, Breyn; and it is subcentral or approaches the inner line of curvature in the genus Phragmoceras, Broderip.

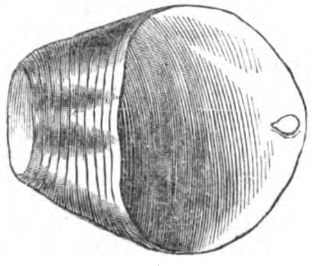
The geological distribution of these forms is nearly as in the Orthocerata. They are all peculiar to the strata below the new red system; and mostly occur below the carboniferous or mountain limestone. Phragmoceras prevails in the Ludlow rocks; Cyrtoceras specially abounds in the strata of South Devon, the Eifel, and the mountain limestone; and Gyroceras and Lituites follow nearly the same rule; a few species of Lituites occur in the Silurian rocks.

We subjoin figures of characteristic forms of Crytoceras, Lituites, and Phragmoceras: of the latter, two figures to show the singular contraction of its aperture.

The brief characters of these generic groups which follow may be sufficient for the recognition of perfect specimens, but such are rarely found in the older rocks, where alone they occur.

Cyrtoceras (κυρτός, curved, and κέρας, a horn), Goldfuss. Bent, arched, or partially convoluted, the free end being sometimes elongated and straight. Septal edges seldom free from a slight waving; siphuncle subdorsal, or even marginal, seldom quite round; aperture nearly orbicular.

Example, Cyrtoceras depressum. From the Eifel.



Cyrtoceras depressum.

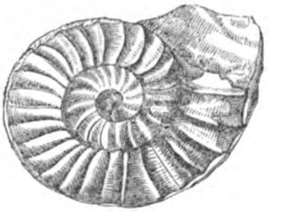
Several other species occur in Devonshire, near Ludlow, &c.

Gyroceras (γυρός, incurved, κέρας, a horn), Meyer. Coiled like a tendril, so that the volutions do not touch. Septal edge even, siphuncle dorsal, marginal. Aperture nearly round.

Gyroceras gracile, Meyer. Bronn, in 'Leth. Geog.,' vol. i., fig. 6. From the states of Dillenburg.

Lituites, Breyn. Convoluted, so that the volutions touch in all the inner part, but afterwards extended into a straight or bent portion. Septa pierced by a subcentral siphuncle. Aperture nearly round.

Example, Lituites articulatus, Sow.



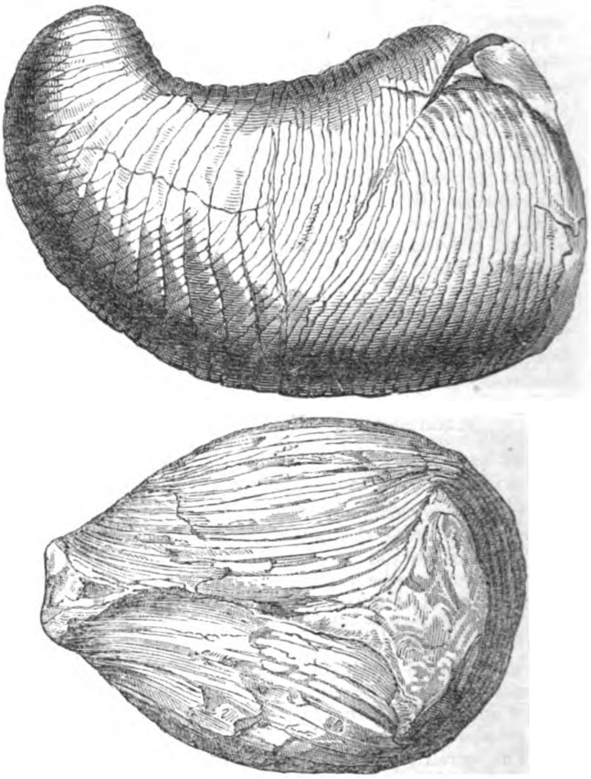
Lituites articulatus.

Phragmoceras (φράγμα, septum, κέρας, a horn), Broderip. Shell incurved and compressed, more or less conical; septal edges entire, crossed externally by the lines of growth; siphuncle near the inner margin; aperture contracted at the middle, its outer extremity produced into an elongated beak.

Example, Phragmoceras ventricosum. Broderip, in 'Silurian Researches.'

C. Among the completely spiral and convoluted Polythalamacea, the situation of the siphuncle and the form of the septa become useful guides.

The siphuncle is dorsal in some Nautili of the mountain limestone, which ought perhaps therefore to be distinguished; subcentral in most of the Nautili of the oolitic, cretaceous, and more recent deposits, as well as in recent species; ventral in Clymenia (Munster) and in some otherwise true Nautili of the coal formation and magnesian limestone.



Phragmoceras veutricosum.

The septa are simply concave, with their edges even, in most Nautili; but in some species (*N. bilobatus*, from the coal formation and mountain limestone) they are deeply undulated, as in the simplest Clymenia [GONIATITES]; in a remarkable fossil from the London clay (*Nautilus ziczac*), deeply and angularly folded, nearly as in some Goniatites. Finally, in the Clymenia of Count Munster, all having a ventral siphuncle, the septal edge is simply waved, or has rounded inflexions, angular bands, or a mixture of these in the same shell.

It is evident from these facts that this part of the classification needs much reconsideration, and that several new genera must be constituted.

The geological distribution of these really convoluted Polythalamacea is interesting and remarkable. The genus Nautilus, as commonly used by English oryctologists, is found in many of the Palæozoic strata, but not in the older ones, in all those of middle age, in the tertiaries, and in the actual ocean. But in the more antient strata, either by a dorsal or a ventral siphon, by peculiarly waved septa, or a discoid figure, the species are widely, and, we believe, generically, disjoined from those of later date. Clymeniæ are only known in a distinct and varied development in strata of the age of certain Devonian and Cornubian rocks, principally at Sth. Petherwin in Cornwall, and in strata believed by Murchison and Sedgwick to be coeval with them, on the flanks of the Fichtelgebirge.

Ammonitidæ.

Following nearly the same plan as that used for the Nautilidæ, we find, from the general figure of these shells, the following divisions:—

A. Baculites, straight.

B. Hamites, Tropæum, Crioceratites, partially convolute, the enlarged end straight.

C. Scaphites, partially convoluted, the free end recurved.

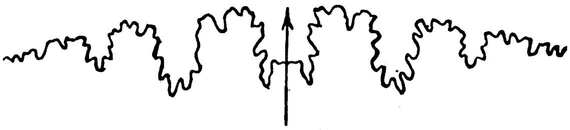
D. Turrilites, spiral round an axis (usually sinistrorsal).

E. Ammonites, Ceratites, Goniatites, convolute or involute.

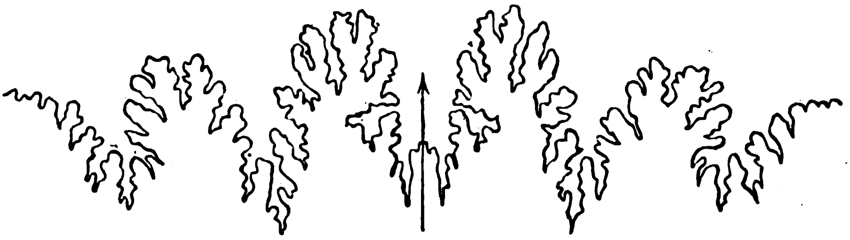
By referring to the article GONIATITES the student may see in what way the subdivision of the only large group of this series (Ammonites, Ceratites, Goniatites, which include many hundred species) may be best effected.

In the article CORNU AMMONIS reference is made to a table of the geological distribution of this group, analysed according to the method of Von Buch.

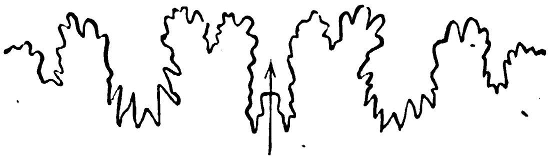
To illustrate this view of the subject we subjoin a few further examples of characteristic Ammonitic sutures, selected from a large series which we prepared a few years since.



Ammonites venustus. (Phillips.) From Speeton clay.



Ammonites sublævis. (Sowerby.) From Kelloway rock.



Ammonites Walcottii. (Sowerby.) From the Lias.

The group A (Baculites) is found chiefly if not wholly in the cretaceous strata (Maastricht, and the chalk of the south of France).

The group B is found in chalk, green-sand, and gault almost wholly (Folkstone, Cambridge, Speeton); but perhaps the species of ammonoidal shells called A. fimbriatus and A. cornucopiæ, from the lias of Yorkshire, should be ranked in the division, as they in fact are, by Mr. Sowerby, under the title of Tropæum. (They are not known to have a straight elongation.)

The group C is very similarly circumstanced, only Scaphites Yoannii being, as far as we know, found in strata below the greensands.

The group D belongs also to the cretaceous rocks.

But the large group E has a prodigious geological range, being found in the whole series of fossilliferous strata from nearly the earliest of the Palæozoic rocks until we arrive at the tertiary series, in which, we believe, no species has really been found, and none have been seen in a recent state. The whole of the Ammonitidæ then have vanished from the oceans, and their way of life is to be inferred from analogy only.

Spirulidæ.

These were partly internal shells (as probably also some of the Ammonitidæ, especially Scaphites, were). Spirula nodosa, Bronn, is certainly not of the genus Spirula, nor is there any reason to admit the occurrence of any of the group below the tertiary strata.

Belemnitidæ.

The genus Actinocamax of Miller, though adopted by Voltz and Blainville, is imaginary, being really only the retral or apicial part of the Belemnite separated from the concamerated portion at a point where nacreous and easily decomposing laminæ prevail, a little behind the apex of the alveolus. This is, we think, quite certain from careful observation of the Belemnites quadratus and other allied forms in the chalk of Northfleet, and Belemnites jaculum of the Speeton clay, the artificial parts of which have been figured as Actinocamaces by Miller and Voltz. Pseudobelus is perhaps differently circumstanced, but its characters are very obscure.

The genus Belemnites is so abundant in the secondary strata of Britain, that at least forty species are possessed by the writer of this article, of which the greater part have not been mentioned in English works on geology. Many other species occur in strata of the same age on the continent of Europe, in India, and in America. It is possible to distinguish by Belemnites alone the leading members of the English and European oolitic and cretaceous systems of strata. Thus, to mention published species only, Belemnites subaduncatus of Voltz, with many allies, is a lias shell; Belemnites Aalensis, also of Voltz, is a shell of the lower oolitic series; Belemnites abbreviatus of Miller, the large variety, is a shell of the middle oolitic series; Belemnites jaculum of Phillips belongs to the Speeton clay; Belemnites Listeri, to the gault and lower chalk ranges: B. quadratus, B. mucronatus, &c., to the chalk generally, or the upper part specially. None have been found in the tertiary series; none have been found below the lias.

Taking then a general view of the distribution of the Polythalamacea noticed in this article, we find—

In a living state . .	Spirulidæ and Nautilidæ.
In the tertiary series .	Some of the Nautilidæ.
In the cretaceous strata	Nautilidæ, Belemnitidæ, Ammonitidæ.
In the oolitic strata .	Nautilidæ, Belemnitidæ, Ammonitidæ.
In the saliferous strata	Nautilidæ (not including Orthocerata), Ammonitidæ (of the type called Ceratites only).
In the carboniferous strata	Nautilidæ, including Cyrtocerata, Orthocerata, Ammonitidæ (of the type called Goniatites only).
In still lower strata .	Nautilidæ (including Cyrtocerata, Phragmocerata, Orthocerata, and Clymeniæ); Ammonitidæ of the type of Goniatites only.

Finally, in strata lower than these, as the Snowdonian slates, where shells and Polypiarian remains occur, none of the Polythalamacea are known.

PO'LYTHEISM (πολύς, much, many, θεός, a god), the doctrine or worship of a plurality of gods. This form of the word is not found in Greek writers. Philo-Judæus conveys the notion by τὸ πολύθεον, and πολύθεος δόξα, and Justin Martyr by πολυθεότης. Philo also speaks of polyarchy (πολυαρχία), with which he contrasts monarchy (μοναρχία), meaning respectively polytheism and the unity of God. St. Athanasius uses πολυθεΐα as the opposite to μοναρχία.

Polytheism differs from idolatry in this respect;—the former refers to a plurality of gods, without including necessarily the notion of *forms*, real or imaginary; the latter refers either to one god only, under some one visible form, or to any number of gods, under as many visible forms.

No one who takes the Bible for his authority will deny that in the earliest ages of mankind the unity of God was implicitly believed. When the idea of a plurality of gods was first entertained, it is impossible to say. The writings of Moses contain no evidence that men were polytheists before the flood; but it is plain that in the time of Moses (B.C. 1500) polytheism prevailed. It is probable that the Chaldæans, of whom Abraham was one, were addicted to polytheism before his time (B.C. 1900); but it is certain that Abraham was not a polytheist. His contemporaries, Melchizedek, king of Salem, and Abimelech, king of the Philistines, both Canaanites, were worshippers of one God, and the God of Abraham himself. The ancient Persians might have been free from polytheism in Abraham's days; but they became first Sabians, or worshippers of the host of heaven, and afterwards Magians, or worshippers of fire. As Magians they held that there are two principles, one the cause of all good, and the other the cause of all evil; the one they represented by darkness, and the other by light; the former, according to Plutarch (*De Isid. et Osir.*, § 46), was called Oromasdes, and the latter Arimanius. [Arimanes.] Among the antient Arabians we find Job and his friends, and Jethro, the contemporary of Moses, worshippers of one God; but yet in the time of Job the worship of the heavenly bodies was practised, as is plainly indicated in *Job*, xxxi., 26, 27. The Ægyptians, in Abraham's days, seem to have had a religion not different from his; but in the time of Moses polytheism had become established among them; for many provisions of his law refer to this fact, and are intended especially to guard the Israelites from imitating the polytheism and idolatry of Ægypt. Cudworth is of opinion (c. 4, § 18) that polytheism originated in Ægypt, but such an assertion is incapable of proof. The Greeks and Romans acknowledged one Being, under the names of Zeus (Ζεύς) and Jupiter, as supreme over all other gods; and they believed further that this one Being was under the absolute power of fate. Yet these inferior beings were worshipped as gods, and the system was essentially polytheistic.

Cudworth has written at great length to show that the antient philosophers in general, though they seem to have been polytheists, were not really such, and that they worshipped mentally one Supreme Being under different names. But however this might be, the popular notions were not so refined. Wherever the philosophers have appeared to be polytheists, the people have been polytheists in reality; and, as Philo-Judæus says (*De Ebrietate*), 'Polytheism in the minds of the ignorant is atheism.'

The progress of polytheism seems to have been, or might have been, something like the following:—men looked upon the sun and the moon, and the whole of the heavenly bodies, with fire, water, earth, and air, as, in some way or other, representing the Deity. Then they gradually substituted the representatives for the Deity himself, and paid adoration to them. Next, in wishing to preserve the memory of departed heroes or great men under the form of pillars or images, they fell into the practice of deifying or worshipping them. Then they regarded certain of the brute creation, as either serviceable and so to be reverenced, or noxious and so to be dreaded, and they converted them into gods. Thus it was also with respect to mountains, rivers, and other inanimate objects. And this was not all: they devised a multitude of rites in honour of their respective gods, some of which were of a most debasing character.

Wherever the Christian religion has been established, polytheism and its attendant evils have disappeared; but there still remain vast portions of the world in which polytheism prevails; and the miseries are inconceivably great which millions of the human race are still voluntarily inflicting upon themselves with a view to propitiate the favour of imaginary deities.

(Cudworth's *Intellectual System*; Henry More's *Mystery of Godliness*; Shuckford's *Connection of Sacred and Profane History*.)

POLYTRE'MA, a genus of Milleporidæ.

POLY'TROPA, Mr. Swainson's name for a genus of *Muricidæ*, placed by him under his second subfamily *Scolyminæ*, with the following

Generic Character.—Bucciniform; but the base narrowed, and ending in a straight and contracted but rather short channel; spire longer, or as long as the aperture; exterior folliculated or tuberculated; inner lip flattened, as in *Purpura*; basal notch small, oblique; no internal channel.

Example, *Polytropa crispata*. (*En. Méth.*, 419, f. 2.)

POLYTRY'PA. [Polypiaria.]

POLY'XENES. [Foraminifera, vol. x., p. 348.]

POMA'CEÆ. [Rosaceæ.]

POMATORHI'NUS. [Merulidæ, vol. xv., p. 123.]

POMBAL, MARQUIS DE. DOM SEBASTIAO JOSE' DE CARVALHO, Count d'Oeyras and Marquis de Pombal, was one of the most able public men that have ever appeared, and certainly the only distinguished statesman that has ever presided over the councils of the Portuguese nation. He was born in 1699, at Soura, a village in the territory of Coimbra, of an old and noble family, though not of the first class. Having completed his early studies in his native village, he was sent to the university of Coimbra for the purpose of studying for the bar. Young Carvalho followed a course of lectures; but the quiet pursuits of the law being incompatible with the vivacity or rather the turbulence of his character, he adopted the profession of arms. But this profession did not prove more agreeable to him than that which he had relinquished. Various causes for his leaving his regiment have been conjectured. What may be the true reason we have no means of deciding; but it is certain that he quitted the corps in which he served, and led a private life till 1739, when, through the influence which his uncle Paulo Carvalho had with Cardinal Motta, a person much in favour with John V., he was appointed extraordinary envoy to the court of London; and afterwards to Vienna, as mediator between the empress Maria Theresa and the Pope, to settle the disputes which had arisen in consequence of the suppression of the archbishopric of Aquileia.

Whilst in that capital, Carvalho had the good fortune to marry a lady of high rank and influence, the Countess Daun, niece of the General of the same name who figures so prominently in the wars of the empress Maria Theresa with Frederick the Great of Prussia. On his return, the queen of John V., who was an Austrian princess, became so much attached to her countrywoman, the lady of Carvalho, that for her sake she prevailed on her son, immediately after the decease of her husband, to raise him to power, in consequence of which Carvalho was entrusted by Joseph I. with the direction of foreign affairs.

Elevated to this high station, Carvalho began to display his great administrative talents. His admirers have gone so far as to compare him with Richelieu; while his enemies, unable to deny the merit of his administrative conduct, have attributed it to ignoble and selfish motives. But both these extremes are equally distant from justice and truth. Carvalho may have been as profound a politician as Richelieu, but the political relations and rank of such a kingdom as Portugal could not and did not offer him a sphere in which to display them; but in the internal and economical administration of the kingdom, in discernment, activity, and legislative abilities, he has no superior. After his promotion, which took place in 1750, Portugal may be said to have been regenerated. He favoured the establishment of several manufactures, and encouraged the art of printing and agriculture; he introduced into the university of Coimbra a system of studies which substituted, for the mere study of the classics and antient languages, the cultivation of the physical and mathematical sciences; he furnished the university with a chemical laboratory, a botanic garden, and an observatory; he introduced into Brazil the cultivation of coffee, sugar, cotton, rice, indigo, and cocoa; he created the companies of Pernambuco, Para, and Maranhao, and established so strict a police in the kingdom, that even idlers and loungers were not allowed to promenade the streets.

With all his great qualities, which command our esteem and admiration, he was detested both at home and abroad. Those who hitherto had lived and enriched themselves by the abuses that had crept into the various branches of administration, as well as those who suffered from the severity of his ordinances, were his declared enemies. He checked the obnoxious power of the Inquisition, and banished the Jesuits from the Portuguese dominions. Whatever might be the policy of the latter measure, it was carried into effect with great inhumanity. [Jesuits, p. 112.] His interference with the monopoly which foreign merchants had acquired in the commerce of Portugal rendered him an object of detestation to foreigners, and particularly the English; still all his measures had for their object the prosperity of the country, which he effectually promoted, so far as to place Portugal on a level with other European states.

The Marquis of Pombal however is not without reproach. His unremitting persecution of the nobility, and his merciless conduct towards the family of the Tavoras and every individual whom he suspected of having had any part in the attempt made against the life of the king, dimmed the brilliancy of his career. It is asserted by some that he conceived a great dislike against the nobility from the time of his first marriage. His first wife, Dona Theresa de Noronha Almada, belonged to one of the most antient families of Portugal, and was the daughter of the only heiress of the Almadas; while he was nothing, and had no other recommendation than a handsome figure, and the power which superior intelligence invariably gives. Her relatives accordingly made the strongest opposition to the marriage with Carvalho, to which circumstance is attributed his hatred of that class.

On the death of Joseph I., the queen, who considered that Carvalho had occupied that place in the affections of the king which she alone ought to have filled, and had likewise taken a dislike to him on account of his persecution of the nobility and the Jesuits, ordered him to retire to Pombal, where he died in the eighty-first year of his age. The finest parts of Lisbon still bear testimony to the value of his administration, for they were built according to his designs after the earthquake. He was created Count d'Oeyras in 1759, as a testimony of the royal regard for the zeal which he displayed when the attempt was made to shoot the king Joseph I.; and on his effecting a reconciliation with the pope at a much later period, his grateful master created him Marquis de Pombal. Although he is accused of enriching himself by means unworthy of his rank, no person who is acquainted with his private habits, with the method which he had adopted to make his property valuable, and with his general system of economy, can doubt of his integrity. When he retired from the ministry, he left about forty-eight millions of cruzados in the public treasury, and thirty in the *caixa de decimos*, a surplus which the government of Portugal had never had before.

(*Recordaçoes de Jacomo Ratton*; *Memoirs of the Marquis of Pombal*; Chalmers's *Biographical Dictionary*; *Biographie Universelle*.)

POME, in botanical language, signifies a fleshy inferior many-celled fruit, such as that of the apple, pear, &c. It differs from a berry in its seed not being buried in pulp.

POMEGRANATE. [PUNICA.]

POMERANIA (in German, *Pommern*), one of the eight provinces of the Prussian monarchy, is situated between 52° and 54° N. lat. and 12° 30′ and 18° E. long. It is bounded on the north by the Baltic, on the east by West Prussia, on the south by Brandenburg, and on the west by Mecklenburg. It is a long tract of coast, extending 200 miles on the Baltic, and varying in breadth from thirty to sixty, and, in some places, to eighty miles. The area is 12,000 square miles, and it is divided into the three governments of Coeslin, Stettin, and Stralsund.

Pomerania is one of the lowest and flattest countries in Germany; only a few hills of moderate height break this continuous level: of these hills, the Gollenberg, between Cöslin and Zunow, which is the highest, has scarcely an elevation of 300 feet. The soil consists of sand; and, along the coast, of sea-sand, which former inundations and repeated storms have spread over the country. The coasts of that part formerly called Further Pomerania are protected against the sea by sand-hills and dikes. Here and there this sand is mixed with clay, or passes into a black fertile loam, especially in the government of Stralsund. The island of Rügen, which belongs to this government, has very broken coasts, but the heaviest and best soil of all Pomerania.

The province is crossed in its broadest part by the Oder, which, flowing through a marshy tract, divides into many arms or channels, one of which, the Great Regelitz, forms, towards its mouth, the great Dammer Lake, and, together with the main stream, falls into the extensive inland water the Frische Haff, the eastern part of which is called the Great Haff, and the western the Little Haff. The water of the Haff is fresh, and it is only during the prevalence of the north wind that it is rather brackish, and considerably higher, owing to the influx of the sea. The two great islands of Usedom and Wollin separate it from the Baltic, with which it is connected by three outlets: on the east by the Divenow, which falls into the sea between Wollin and the continent, after forming a great lake called the Kaminsche Boden; in the middle by the Swine, between Wollin and Usedom; and on the west by the Peene, between Usedom and the continent. These three outlets might be called the mouths of the Oder. The Ucker from Brandenburg, and the Peene from Mecklenburg, both navigable streams, fall into the Frische Haff. The Ihna flows into the Dammer Lake. Most of the other rivers fall, after a short course, into the Baltic. There are many small lakes: that of Madine, which is celebrated for its lampreys, is one of the largest. The navigation on the Pomeranian coast is dangerous, owing to the want of harbours, there being only three safe ones, Stralsund, Swinemunde, and Colberg.

The climate of Pomerania is cold, and the weather is changeable: storms on the coast are not uncommon. The natural productions of the country are:—1, horses, horned cattle, sheep, goats, swine, small game, domestic poultry (especially geese), sea and river fish, and bees; 2, corn, peas and beans, potatoes, fruit, timber, flax, and tobacco; 3, alum, bog-iron, salt, turf, and amber. The soil in some parts is so indifferent, and the climate so unfavourable, that agriculture is in a very backward state; and notwithstanding the industry of the inhabitants, no great improvement can be effected. The Pomeranian however has done everything that is possible, and many parts are admirably cultivated. The country produces more corn than is required for home consumption. Sufficient flax is grown for the use of the inhabitants; and fruit is so abundant, that large quantities, especially of apples, are exported. The breeding of horned cattle is carried on to a great extent; the flocks of sheep are numerous on the great estates; and all the country-people keep numbers of swine. The breeding of poultry is very profitable: immense flocks of geese are kept, the quills, feathers, and smoked breasts of which (celebrated in all Germany and the north of Europe by the name of Pommernsche Spickgänse) are most important articles of exportation. The Pomeranian forests are very extensive and productive. The fisheries likewise yield a considerable profit; but the sea-fishing is not carried on to the extent that it might be. Of fresh-water fish, large quantities, both fresh and smoked, are exported. The mineral kingdom is poor. Some bog-iron ore is smelted at Torgelow; there are salt-works at Colberg; and some amber is procured, especially near Stolpe. The most important article is turf, of which about sixteen million sods (bricks, as they are called) are annually dug. There are no manufactures of much importance; good and strong linen however is made, and is a considerable article of exportation. What manufactures there are, are confined to the principal towns. [STARGARD; STETTIN; STRALSUND.] The trade of this province is very important; it is carried on partly by sea, partly on the Oder, and partly by land, with the neighbouring provinces. The exports include all the natural productions of the country; the imports are colonial articles, some manufactured goods, and there is also a great transit trade to and from the provinces on the Oder, especially Brandenburg and Silesia.

The inhabitants are by descent partly Sclavonians and partly Germans. German peasants were brought into the country in the twelfth century, especially by the monasteries, and the dukes founded German towns and villages, to which they granted great privileges. Hence the Germans in process of time outnumbered the antient race. Genuine Sclavonian blood is now only to be met with in the north-eastern corner of the province, where these people preserve their own dialect of the Sclavonic language, and still differ in manners and customs from their German fellow-countrymen. The nobles are numerous, chiefly consisting of German families who have settled here since the twelfth century, and possess several important privileges, though they have been much abridged of late years. The vassalage of the peasants was abolished by the late king Frederick William III. The population, according to Dieterici (1838), was 941,193, that is, on an average, 1660 to one German or twenty-one English square miles. A remarkable increase has taken place in the government of Cöslin, where, in 1815, there were only 900 persons on a German square mile, and in 1838, 1300. The great majority of the inhabitants are Lutherans: there are a few French and German Calvinists, about 7000 Roman Catholics, and 4200 Jews. On the 15th of June, 1824, the 700th anniversary of the introduction of Christianity into Pomerania was celebrated with great solemnity in the whole province.

Pomerania was formerly a considerable part of the antient kingdom of the Wends, or Vandals. From the year 1062 it had its own dukes, of whom Boleslaus X., or the Great, is one of the most distinguished. The Christian religion was introduced in the twelfth century; the first Pomeranian converts were baptised on the 15th of June, 1124, by Otto (Otho), bishop of Bamberg, at a place called Ottobrunn (Otto's Well). The line of the dukes became extinct on the death of Boleslaus XIII., in 1637. The last female descendant of the Pomeranian dukes was married to a Prince Croy, after whose death she returned to Pomerania, where she died, on the 19th July, 1660, having instituted a festival to be kept every ten years in memory of the line of princes which became extinct in her person. On the death of the last duke of Pomerania, the electoral House of Brandenburg, conformably to a family compact, should have taken possession of the whole country; but Pomerania having been occupied by the Swedes during the Thirty Years' war, Prussia was obliged to be content, at the peace of Westphalia, with Further Pomerania (to the east of the Oder), leaving Sweden in possession of Hither Pomerania, with the island of Rügen. Charles XII. of Sweden was however obliged to cede, by the treaty of Stockholm in 1720, the southern part of Pomerania and the islands of Usedom and Wollin to Frederick William I., king of Prussia. Lastly, by a convention concluded on the 4th of June, 1815, Prussia obtained possession of the whole of Swedish Pomerania, which Sweden had ceded to Denmark as a compensation for Norway. In exchange, Prussia gave to Denmark—1, the duchy of Lauenburg, which it had obtained from Hanover in exchange for East Friesland; 2, a sum of two millions of dollars, paying also 600,000 Swedish dollars which Denmark owed to Sweden; 3, it indemnified the Swedish holders of dotations in this province to the amount of 43,000 dollars annually; 4, it paid to Sweden 3,500,000 dollars: so that Prussia gave for this province the duchy of Lauenburg, 5,500,000 Prussian dollars, 600,000 Swedish dollars, and the indemnity to the Swedish holders of dotations. It is worthy of remark, that the sum of three millions and a half of dollars paid by Prussia to Sweden for a province of which Sweden had been in possession two centuries, was claimed by the present king of Sweden (Bernadotte) as belonging to himself. Of this sum he applied two millions to the service of the state, as an especial favour, and put the remaining million and a half into his own pocket.

(Stein, *Geographisches Lexicon; Conversations Lexicon;* Dieterici, *Von dem Verkehr im Preussischen Staate und im Deutschen Zollverbande;* Hassel, *Handbuch.*)

POMFRET, JOHN, was born in 1667, at Luton in Bedfordshire. He studied at Queen's College, Cambridge, where he was admitted to a Bachelor's degree in 1684, and to a Master's in 1698. Having entered into orders, he obtained the rectory of Maldon in Bedfordshire. In 1703 he came to London with the prospect of obtaining further preferment, but found Bishop Compton strongly prejudiced against him on account of some lines in 'The Choice,' which seemed to imply that a mistress was to be preferred to a wife; and before Pomfret, who was now married, could remove the bishop's objections, he was attacked by the small-pox, which carried him off in 1703, in his thirty-sixth year.

He published his poems in 1699, and some additional poems were published after his death by an anonymous friend. His poems had once many readers, especially 'The Choice,' in which he describes how he would live if he had a moderate independence—what would be his choice of a house and garden, of wines, of books, of friends, and of a female friend, for he 'would have no wife.' Dr. Johnson says that 'he has been always a favourite with that class of readers who, without vanity or criticism, seek only their own amusement.' We doubt if any class of readers now exists who could find amusement in reading such poems as those of Pomfret. They are deservedly neglected.

(Johnson's *Lives of the Poets.*)

POMMERN. [POMERANIA.]

POMŒ'RIUM, or, as it is written in inscriptions, POMERIUM. The Pomœrium, according to Livy (i. 44), was a consecrated spot on each side of the wall of the city of Rome. This spot was consecrated by the Eutruscan ceremonies of inauguration; and whenever the city was enlarged, the Pomœrium was also extended. The space within the wall might not be built upon, and the space without might not be tilled.

This definition of the Pomœrium is true only where the Pomœrium coincides with the real wall; since during the later times of the kings, and subsequently, the Pomœrium was not the same as the wall. The Pomœrium included that part of the city which was consecrated by Etruscan auspices, which belonged exclusively to the patricians; and thus the Aventine, which was inhabited by the plebeians, was never included within the Pomœrium till the reign of the emperor Claudius (Aul. Gell., xiii. 14), although it had long before that time formed part of the city. The Pomœrium of Romulus, which is traced by Tacitus (*Ann.*, xii. 24), included only the Palatine. The Quirinal hill is said to have been added by Numa (Dionys., *Ant. Rom.*, ii. 62), and the Cælian by Tullus Hostilius, to the boundaries of the city, by which is probably meant that they were included within the Pomœrium, or consecrated part of the city, since the actual fortifications were not completed till the time of Servius Tullius. The Quirinal and Viminal hills were added to the Pomœrium by Servius Tullius (Liv., i. 44), and the Aventine, as already stated, by the emperor Claudius.

We learn from Tacitus (*Ann.*, xii. 23) and Aulus Gellius (xiii. 14) that those persons only were allowed to extend the pomœrium who had enlarged the limits of the empire. Tacitus adds that no one had used this privilege from the time of the kings to that of Claudius, except Sulla and the emperor Augustus. Other writers however say that it was done by Julius Cæsar.

(Aul. Gell., xiii. 14; Dion Cass., xliii. 50; Cic., *Ep. ad Att.*, xiii. 20, 33, 35.)

POMO'NA, or MAINLAND. [ORKNEYS.]

POMPADOUR, MADAME DE. [LOUIS XV.]

POMPE'I, GIRO'LAMO, born at Verona in 1731, of a patrician family, applied himself chiefly to the study of the Greek and Latin writers, and became a good Hellenist. His translation of the 'Lives' of Plutarch is by far the best in the Italian language, and has gone through more than ten editions. In 1785 Pompei was offered a chair in the university of Pavia, which he declined, out of attachment to his native town. He was intimate with Maffei, Torelli, Rosa Morando, and other learned men of Verona, and he was preceptor to Ippolito Pindemonte, and also to two accomplished ladies of the same town, Elisabetta Mosconi and Silvia Curtoni Verza. Pompei died at Verona in 1788. His other works consist of 'Canzoni Pastorali,' which are much esteemed, and other Italian poetry, including some translations from the Greek, and of several dissertations. His biography has been written by his disciple Pindemonte, and by Cardinal Fontana, 'De Vita et Scriptis Hieronymi Pompei.'

POMPEII, an antient town of Campania, situated about thirteen miles south-east of Naples, in a plain at the foot of Vesuvius, through which runs the little river Sarno. The town appears to have been once close to the sea, but is now nearly two miles from it, in consequence of the physical changes which have taken place in this district. It stood on an eminence formed by a bed of lava, which seems to have been thrown up from the ground in this spot, and in several other places round the foot of Vesuvius, long before any of the eruptions recorded in history. Pompeii, as well as the neighbouring town of Herculanium, is said by Strabo (p. 247) to have been originally possessed by the Osci, and then by the Tyrseni and Pelasgi. It afterwards fell under the power of the Greek colonies of Cumæ and Parthenope, and lastly of the Samnites (about 440 B.C.), who made themselves masters of this coast as far as the river Silarus. About eighty years later the inhabitants of Campania threw off the yoke of the Samnites, and placed themselves under the protection of Rome. In the second Punic war the Campanians joined Hannibal, but were severely punished for it by the Romans, who brought the country under subjection. Pompeii however is not mentioned among the towns hostile to Rome. In the Social War (90 B.C.) the Campanian towns revolted, and Pompeii, among them, joined the Marsian Confederacy. At the end of that war several of those towns were severely chastised by the Romans. Stabiæ, which stood within four or five miles south by east of Pompeii, was entirely destroyed, but Pompeii appears to have been spared. Nothing more of any importance is recorded of Pompeii, except a quarrel between the inhabitants and those of Nuceria on the occasion of a gladiatorial fight in the amphitheatre of Pompeii, which many of the Nucerians had come to witness. The affair was brought before the emperor Nero, who adjudged that the Pompeians should be deprived of all theatrical amusements for ten years, a punishment which was considered very severe in those times. Four years after this a fearful earthquake threw down a great part of Pompeii, A.D. 63. The following year, while Nero was singing at Naples, another earthquake occurred. At last, in the year A.D. 79, in the month of August, the first recorded eruption of Vesuvius took place, which is well known from the letter of Pliny the Younger, whose uncle lost his life on the occasion. [Plinius.]

In this eruption both Herculanium and Pompeii were buried; the former under a mass of lava, Pompeii under showers of stones, cinders, and ashes. The ceilings and upper stories of the houses, being chiefly of wood, were either burnt by the red-hot stones and cinders ejected from Vesuvius, or were broken down by the weight of matter collected on the roofs. The catastrophe was not so sudden but that most of the inhabitants had time to escape with their moveable property: indeed it would appear that the town was not altogether buried in one eruption, but that this was the work of several consecutive eruptions, between which the inhabitants had time to come and revisit their half-ruined habitations and recover some of their property. Successive layers of volcanic matter are clearly traced, and the lowest has evidently been moved, but the others are untouched. A bed of soil at last formed itself all over the town, filling up the vacant spaces between the buildings, grass grew upon it, corn was sown, and the vine was planted in the fields thus formed above the ruins of Pompeii, whose existence was forgotten until 1689, when the first indications of ruins protruding above the ground were noticed. In 1755 the excavations began. They have been interrupted and resumed at various times, and the result has been that about a fourth part of the city along the western side of the walls has been excavated and cleared of the rubbish. This portion, which appears to have been the finest part of the town, contains about eighty houses and numerous small shops, two theatres, two basilicæ, eight temples, the forum, the amphitheatre, the baths, the prison, and other public buildings of less note. The city was antiently surrounded by walls, of which the greater portion has been traced, including six gates and twelve towers. The circuit of the walls is nearly two miles, and the area within measures about one hundred and sixty-one acres. There were however suburbs, one of which, at the north-western or Herculanium gate, is partly excavated, and is called the street of tombs, from a number of handsome tombs which line the road leading to the town. The suburban villa, called the villa of Diomedes, is in this quarter. On entering the gate the visitor finds himself in a long tortuous street leading to the forum. To the left of this street is the house called that of Sallust, which occupies a square of about forty yards; and near it is the house of Pansa, which, with its court and garden, is about one hundred yards long by forty wide. These are the two finest private houses yet excavated, and they afford a good specimen of the interior arrangement of the dwelling-houses of the antient Romans. [Atrium.] Nearer to the forum are the baths, in very good preservation, which appear to have been finished a short time before the destruction of the town. A description of them is given under Baths.

Upon entering the forum the spectator finds himself in a large oblong area, about one hundred and twenty yards long and forty wide, surrounded by columns, pedestals which once supported statues, the ruins of temples, triumphal arches, and other public buildings. Around the west, south, and east sides there runs a Grecian Doric colonnade, some of the columns of which are standing; they are two feet three inches in diameter, and twelve feet in height; the interval between them is six feet ten inches. At the north end of the forum stand the ruins of a building, which has been called the temple of Jupiter, 120 feet long and 43 feet wide: when entire, it must have been 60 feet high. The columns are of the Corinthian order, and three feet eight inches in diameter. On the west side of the forum is the temple of Venus, which stood in an open area surrounded by a wall and portico. Beyond it, to the south, is the basilica, or court of justice, the largest building in Pompeii, 220 feet long and 80 wide: the lateral walls remain, but the roof and upper gallery have fallen in. On the opposite or eastern side of the forum is a building which was erected by a woman of the name of Eumachia, apparently as a place of assembly for men in business, and especially for the cloth scourers, who constituted a considerable body at Pompeii. It consists of a large area 130 feet by 65, surrounded by a double gallery, and having a portico in front. On the same side of the forum, but towards its northern end, is the Pantheon, so called from twelve pedestals placed in a circle round an altar in the centre of an extensive area, on one side of which are cells for the priests, and on the other side is an adicula, the walls of which are covered with beautiful fresco paintings, the colours of which still retain all their vividness.

The other public buildings of Pompeii which have been excavated are the two theatres, the larger of which is capable of containing about 5000 persons; the temple of Hercules, which is the oldest building in the town, and the amphitheatre. The latter, which is at the eastern extremity of the town, separate from the other excavated parts of the town, is 430 feet long and 335 feet broad. It resembles in its structure the other buildings of the same class, which are described under Amphitheatre.

For a description of these buildings the reader is referred to the work entitled 'Pompeii,' in the *Library of Entertaining Knowledge*, published under the superintendence of the Useful Knowledge Society, and to the elaborate works of Mazois, Sir William Gell, and Donaldson.

The greater part of the private dwellings are small and mean, for the inhabitants lived mostly out of doors, and reserved all their magnificence for the public buildings. The numerous statues, medals, and other moveable antiquities found at Pompeii have been deposited in the Royal Museum of Naples, and are described in the work entitled 'Museo Borbonico,' published at Naples.

POMPEIUS, CNEIUS, commonly called Pompey, was born on the 30th of September, 106 B.C., in the consulship of C. Attilius Serranus and Q. Servilius Cæpio, a few months after the birth of Cicero. He was six years older than Cæsar. His family was plebeian, and one of his ancestors was said to have been a flute-player. His father, Pompeius Strabo, however, joined the aristocratic party, and fought under their banner in the Marsic war, but, being a man of extreme selfishness, he was in reality faithful to no party, and at last made himself so notorious for his avarice and cruelty, that, after he had been killed by a flash of lightning, the people at his funeral tore the body from the bier and dragged it through the streets of Rome. (Plut., *Pomp.*, i.; Vell. Pat., ii. 21.)

Respecting the early education of Pompey nothing is known, and the first time we find his name mentioned is in 89 B.C., in the Marsic war, when he accompanied his father to fight against the Italians; he was also in the battle at the gates of Rome between his father and Cinna and Sertorius. Soon after this battle, Cinna caused money to be distributed among the soldiers of Pompeius Strabo, and bribed a friend and comrade of Pompey to murder him and his father; but the courage of the young man saved his own and his father's life, and put down an insurrection among the discontented soldiers. His father died soon after this event, and when the Marian party gained the upper hand, and made their entrance into the city, the house of Pompey was plundered. It was not until after the death of Marius, in 86 B.C., that he ventured to appear again in public, when his enemies immediately charged him with being the accomplice of his father in the plunder of Asculum. Having no confidence either in the justice of his cause or the eloquence of his advocates L. Martius Philippus and Q. Hortensius, he secretly betrothed himself to the daughter of P. Antistius, who was to preside at the trial, by which means, together with the protection of Carbo, he was acquitted.

When Sulla was returning from his expedition against Mithridates, Pompey, who had fled from the camp of Cinna just before he was murdered, was in Picenum, where he possessed very extensive estates and great influence. (Vell. Pat., ii. 29.) Here he was engaged in raising at his own expense an army, with which he hoped to overcome the Marian party before the arrival of Sulla, and thus to gain immortal fame. Without the authority or sanction of the Roman senate he organised three legions, consisting chiefly of the veterans of his father. Three generals of the Marian party surrounded him in three different camps, and their imprudent conduct enabled him to attain his object. He directed his main force against one of them, M. Brutus, and defeated his cavalry, which in its flight threw the infantry into disorder; the two other generals, discouraged by the failure of their colleague, retreated. Pompey was received in all the towns of Picenum as their deliverer. (Plut., *Pomp.*, 7.) The senate was indignant at his arbitrary proceedings, but his army remained faithful to him. At the interview which he afterwards had with Sulla, for whose cause he had so successfully exerted himself, he displayed enough of his vain and ambitious character for Sulla to discover that Pompey wished to be looked upon as a man of no less importance than himself. When therefore Pompey, with apparent humility, saluted him as imperator, Sulla returned the compliment. Thus Pompey's wishes were gratified, and the impression made upon his soldiers, who now began to look upon him, a young man of twenty-three years of age (Vell. Pat., ii. 29, 1), as their legitimate general, was highly favourable. But not being recognised by the senate, and not fighting under the auspices of Sulla, he was in reality nothing but the leader of an armed band of adventurers.

Sulla was made dictator, and the civil war was carried on in Italy with unremitting vigour. While the consul C. Marius the Younger was besieged in Præneste (82 B.C.), his colleague Cn. Carbo fought an indecisive battle against Sulla at Clusium, but his legates Marcius and Carrinas were defeated by Pompey. Carbo then retreated to Ariminum, and sent Marcius to the relief of Præneste, but Pompey repelled him in the Apennines with great loss. Carbo himself in despair sailed to Africa, but his troops, which remained in Etruria, were closely watched and afterwards dispersed by Pompey, whereby the fall of Præneste was prepared. Sulla, partly to reward the young champion of his party, partly to make himself sure of his attachment, presented him with the hand of his step-daughter Æmilia, who was pregnant by Manius Glabrio, from whom she was obliged to separate. (Plut., *Sulla*, 33; *Pomp.*, 9.) Pompey, who was married to Antistia, abandoned her, but Æmilia soon afterwards died in childbed. Pompey was thus a declared champion of the party of Sulla, and after the war in Italy was brought to a conclusion, he undertook to punish the remaining enemies of the aristocracy in Sicily, Africa, and Spain. Carbo attempted to escape to Egypt, but was overtaken and brought in chains before Pompey, at Lilybœum; his companions were put to death without even the form of a trial; Carbo, though he had once shown himself a friend to Pompey, was solemnly condemned to death, and Pompey sent his head to Sulla. All Sicily submitted to him without any further resistance. Much has been said about his moderation in this island, but he only spared those whom it would have been useless to destroy. Leaving the administration of Sicily in the hands of Memmius, his brother-in-law, he set out for Africa with an immense fleet to oppose Domitius Ahenobarbus, under whom some remnants of the Marian party had assembled, and also to support Hiempsal, a friend of Sulla, against Hiarbas, king of Numidia. A battle ensued, in which Pompey, though with great loss, gained a victory. Domitius fell, Hiarbas was put to death, and Hiempsal restored to his throne. The whole object of this campaign was attained in the course of a few months, and Pompey gained general admiration for his disinterestedness. He returned to Rome, where thousands came out to meet and gaze at the young hero. Sulla himself complimented him with the appellation of Magnus (the great), which henceforth became hereditary in his family. The time at which he received this surname is differently stated by different authors, but from the examination of the various accounts in Drumann's 'Hist. of Rome' (vol. iv., p. 335, &c.), it cannot be doubted that he obtained it after his African expedition. But the vanity of Pompey was not satisfied with these distinctions, and although he had not yet held any public office, and was only a knight (eques), he was bent upon entering Rome in triumph. Several discussions took place in the senate, where great efforts were made to prevent such an unprecedented occurrence, and when at length Pompey had recourse to threats, saying that the people would prefer the rising to the setting sun, Sulla, indignant at his arrogance, exclaimed, 'Well, let him triumph.' Pompey thus entered Rome in triumph. After this display of childish vanity Sulla treated him with a coldness which did not fall much short of contempt. (Plut., *Pomp.*, 15.)

This feature of vanity in his character explains the otherwise unaccountable fact that, in opposition to Sulla, he exerted all his influence to secure the consulship for Æmilius Lepidus. Sulla, foreseeing the consequences, said to Pompey, on this occasion, 'Thou hast given the sword into the hands of thy own enemy.' Sulla soon after died (78 B.C.), and Lepidus openly made the impotent attempt to rescind all the laws of the late dictator, in which he hoped to be supported by Pompey; but Pompey, remaining faithful to his party, saved the aristocracy. It was only owing to the great precautions taken by the senate that peace and order were maintained during the consulship of Lepidus and Q. Catulus; but after the expiration of the year, when Lepidus had gone to his province of Gaul, the war broke out. Lepidus was defeated by the united forces of his late colleague Catulus and Pompey, and the latter was now commanded by the senate to take the field against M. Junius Brutus, the father of the celebrated Brutus, who was still at the head of a division of the army of Lepidus in Cisalpine Gaul. Brutus defended himself bravely in Mutina, until at length either an insurrection among his soldiers or hunger compelled him to surrender: he obtained the promise of safe passage, but was put to death the next day by Geminius, at the command of Pompey. (Plut., *Pomp.*, 16, 64; *Brut.*, 4.) Scipio Æmilianus, the son of Lepidus, was made prisoner in Liguria, and likewise put to death at the command of Pompey. Lepidus was at length attacked by Catulus and Pompey, in the neighbourhood of Cosa, and being again defeated, he resolved, with the remnant of his army, to seek refuge in Sardinia, but he was repelled from the island by the Roman governor, and soon after died. The surviving followers were treated with great clemency, partly that they might not be induced to join the army of Sertorius in Spain, and partly because the victorious party themselves wished for peace in order to enjoy the fruits of their victory. Pompey also received orders to lay down his arms and return to Rome. He disobeyed the command under various pretexts; but the truth was, he was anxious to obtain the command against Sertorius. And when indeed the power of Sertorius assumed a more threatening character, when Perperna had joined his army, and the senate saw no one else that could be entrusted with the command against so formidable an enemy, it was at length reluctantly decreed that Pompey should be sent to Spain with the power of a proconsul, and in 40 days he was ready for departure, with an army of 30,000 foot and 1000 horse. He left Italy in 76 B.C., when he was thirty years of age. He crossed the Alps, according to Appian (*Civil.*, i. 109), between the rivers Rhône and Po, and directed his course towards the southern coast of Spain. Several Spanish tribes, and even Lauron, when besieged by his adversaries, declared for him. In the ensuing campaign Metellus defeated Perperna, and took his camp, but Sertorius wounded Pompey with his own spear, and compelled him to retreat. Not long after, a great battle was fought near Seguntia, in which Pompey was again defeated, and 6000 of his men were slain. In this way the war was carried on with various success for nearly four years; and had not Sertorius been betrayed by the Spaniards, and at last assassinated by conspirators headed by Perperna (74 B.C.), he would probably have driven the Romans from Spain, although Pompey conducted the war with great skill. He now also received reinforcements from Italy, where his demands were readily granted by the senate, and strongly supported by the consul Lucullus, who feared lest Pompey might return, as he had threatened to do, and obtain the command against Mithridates. Pompey advanced in Spain as far west as Cale (Porto).

After the death of Sertorius, Perperna was at the head of his armies; but as he had never distinguished himself as a general, he secured no confidence. He was undecided whether he should offer battle to Pompey, until he was emboldened by the appearance of a small division of the enemy's army, but he soon found himself attacked by the whole hostile forces, and took to flight. He was found in a wood; and, in order to save his life, offered to deliver up to Pompey letters of Roman nobles, in which they had invited Sertorius to Italy, and expressed their aversion to the constitution of Sulla. Pompey refused to see him, and ordered him to be put to death, and the papers to be burned without being read. The army of Perperna dispersed; but those who could not expect a pardon sought refuge in those towns which were determined to defend their liberty to the last. Some of these towns were razed to the ground by Pompey, while some distinguished Spaniards, who had supported the enemy of their own country, were individually rewarded with the Roman franchise. (Cic., *Pro C. Balbo*, 8.) As Metellus left Spain before Pompey, the latter availed himself of this opportunity to make it appear that he alone had accomplished the pacification of Spain, and, with the assistance of commissioners sent by the senate, he proceeded to organise the administration of the province of Spain. The apparent success with which his undertaking had been crowned increased his vanity and the admiration of the multitude, who took him for what he wished to appear, and longed to see him return to Italy, where another great object was to be accomplished. Almost the whole of southern Italy was in the hands of the revolted slaves under Spartacus. On his return, Pompey erected in the Pyrenees, on the road to Gaul, a pillar, with an inscription recording his victories. (Strabo, iii., 4, p. 257, and iv., 5, p. 287, Tauchnitz.) On his return through Gaul he settled some of the bands which had served under Sertorius in Gallia Aquitania, in a place which hence received the name of Lugdunum Convenarum (St. Bertrand). (Hieronym., *Adv. Vigilant.*, tom. iv., p. 282, ed. Monach. Benedict., Paris.)

Pompey had hitherto been constantly engaged at the head of his armies, and was totally unacquainted with the internal administration of the republic. The aristocratic party felt little gratitude for his services; for each individual among them was jealous of him, while as a body they feared him: the people, on the other hand, had long forgotten that he was the head of the party of Sulla, and saw in him only their deliverer from an enemy who had threatened to invade Italy with hosts of barbarians. On his arrival in Italy, he did not, as the laws required, dismiss his troops, for he knew that with them he might obtain anything from the senate. Crassus, a friend of the aristocratic party, had been conducting the war against the slaves; and on hearing of the return of Pompey, he had hastened to bring it to a conclusion, in order that Pompey might not snatch the laurels from him The war was indeed at an end on the return of Pompey, but he found an opportunity of cutting to pieces a body of 5000 slaves, who were on their march to seek refuge beyond the Alps, and he wrote to the senate that Crassus had indeed gained the victory, but that he had rooted out the war. Crassus felt this arrogance the more keenly, as he wished to obtain the consulship with Pompey, and was obliged to make use of the influence which Pompey had gained at his cost. Pompey, though absent from Rome, was a candidate for the consulship, and was prudent enough to recommend Crassus as his colleague. As Pompey had not yet held any of the minor civil offices, he could not legally be a candidate for the consulship. But the senate, not wishing to have the two most powerful men in the state their enemies, was obliged to suspend the laws in favour of Pompey, and he and Crassus were elected consuls for the year 70 B.C.

Pompey had now little difficulty in obtaining a second triumph, especially as he had become a great favourite with the people, and had declared that he would restore the tribunician power, which was abolished by Sulla, and would do all he could to stop the abuse which the aristocratic party made of their judicial power. The two consuls elect and Metellus stood with their armies before Rome, and on the 31st of September, 71 B.C., Crassus entered the city in an ovation, and Pompey and Metellus in triumph. Both consuls now did their utmost to gain the favour of the people, and Pompey began to fulfil his promises. The question concerning the restoration of the tribunician power had been agitated for many years, but without success; the people were now in a state of great excitement, for the abuse of their power by the senatorial party had become intolerable. When Pompey brought his rogation before the senate, the opposition was not so strong as might have been expected. Supported by his troops, which were still in the neighbourhood of Rome, by Crassus, and the exasperation of the people, Pompey carried his bill. Much may be said both for and against this restoration of the tribuneship; thus much however is certain, that the advantages were more apparent than real. Pompey had thus gradually changed his original position, and from a champion of the senatorial party, he had become a man of the people, and found himself at once by the side of Cæsar, who was already beginning to exercise an influence over him. This measure, which at the time gained him general popularity, was soon followed by another proposed by the tribune Aurelius Cotta, which deprived the senators of their exclusive possession of the judicia publica, and divided the judicial power equally among the senators, the knights, and the people, the last being represented by the tribuni Aerarii. This measure was productive of little improvement, for moral corruption was not peculiar to any one class, but pervaded the whole nation.

After the expiration of his consulship Pompey refused to go into a province, but he dismissed his army, and remained at Rome for two years without holding any office. During this time he seldom appeared in public, and never without a numerous train, which was well calculated to impress the people with his importance. He foresaw that the time was not far distant when his invincible arm would again be required to save Rome from destruction. The Mediterranean was about this time almost covered with pirates. They landed on all parts of the coast, and even in the immediate neighbourhood of Rome. The high-roads of Italy were not safe. Rome itself was suffering from scarcity of provisions, for almost all convoys bound for the city were intercepted by the pirates. The tribune A. Gabinius, a man whose fortune was completely ruined, brought forward a rogation that a consular man should be invested with unlimited powers for three years over the whole Mediterranean and its coasts to a distance of fifty miles from the sea, and that all the resources of the state should be at his disposal. No individual was mentioned, but the eyes of the people were directed to Pompey as the only man capable of saving the republic. He himself kept in the background: in the senate the rogation met with a fierce opposition, but Cæsar supported it, and thereby alienated Pompey still more from his former party. When the day came for the measure to be decided by the votes of the people, Pompey appeared in the market-place entreating the people not to draw him again into the field of action, and to appoint a more deserving general. This piece of hypocrisy had the desired effect, and the rogation was carried on the second day, notwithstanding the most violent opposition. The price of provisions immediately fell with the prospect of a speedy delivery from the pirates. However contemptible the means by which Pompey obtained the command, the manner in which he fulfilled his commission was deserving of the highest praise. The preparations for war were completed during the winter, and in the spring of the year 67 B.C. he began his operations in the Mediterranean. His legates were stationed in various quarters of the sea to draw forth the pirates and to prevent them from uniting their forces he himself with the main armament swept the sea and drove the pirates eastward. Within forty days the sea between Africa, Spain, and Italy was cleared, and Rome already felt the benefit of his exploits. He then landed at Athens, where he was received with divine honours, and after a short stay he proceeded on his expedition. The pirates who had not yet surrendered were at last surrounded and blockaded near the coast of Cilicia. Here the first and decisive battle was fought at Coracesium. The pirates were defeated, and took refuge in the town, which they surrendered after some resistance, together with all their ships and arms. Numbers of the pirates had deserted previous to the decisive battle, and the humanity with which they had been treated by Pompey contributed not a little to induce the rest to surrender. All the towns and former strongholds of the pirates opened their gates to Pompey; most of their fortresses, and everything which might enable the pirates to recover their strength, were destroyed, and they themselves were transplanted to Soloeis (henceforward called Pompeiopolis) and other deserted towns of Cilicia and Greece, where it was impossible for them again to resume their former mode of life. The whole war did not last above three months. One hundred and twenty towns and castles were occupied by the Romans, and partly destroyed; 1300 ships were burned, 72 were taken, and 306 others surrendered.

In the meantime some of his enemies at Rome began again to try their strength, but Pompey, at the head of his immense forces, and with dictatorial power over a great part of the empire, was little concerned about it, and he remained in Asia, for his object now was to be invested with the command against Mithridates. The war against this king had long been carried on with varying success, but no decisive advantage had yet been gained. The people at Rome had now the most unbounded confidence in Pompey, and when C. Manilius produced a bill (Cicero, *Pro Lege Manilia*) for giving to Pompey the conduct of the war against Mithridates, with unlimited power over the fleet and the army in the East, and with the rights of a proconsul in all parts of Asia, it was carried notwithstanding the opposition of Catulus and Hortensius. The intelligence of this decree was received by Pompey in his usual manner, with apparent dissatisfaction with those who, as he said, would allow him no peace, and would expose him to the greatest dangers in order to get rid of him. (Dion Cass., xxxvi. 28; Plut., *Pomp.*, 30.) Notwithstanding this, he immediately set out (66 B.C.) to take the place of Lucullus, whom he treated with arrogance and the neglect of all common civility.

It is a fact admitted by the antient writers themselves, that the power of Mithridates was broken before Pompey undertook the command, but it is nevertheless certain that he acted with great energy and prudence, so that the expectations of the people at Rome were fully justified. He sent his fleet round the coast from Syria to the Thracian Bosporus (Plut., *Pomp.*, 31, 32), and hastened from Crete to Galatia, where he assembled his land-troops. Proposals which he made to the king were rejected. Pompey allowed Phraates, king of Parthia, to make an attack on Armenia, and thereby made him his friend and ally. Mithridates, seeing himself thus deprived of his hope of receiving succours from Parthia (Appian, *Mithrid.*, 87; Dion Cass., xxxvi., p. 24), sued for peace; but the negotiation failed. Pompey then marched throught Lesser Armenia across the Euphrates to Acilisene, in order to separate Mithridates from Tigranes. The king took the same direction. The hostile armies met, and after some skirmishes Mithridates retreated to save his men, but he was attacked by the Romans at night in a narrow pass, where 10,000 of his army were slain and an equal number made prisoners, while Pompey only lost a small number. The king himself escaped with some horsemen to the Tauric Chersonese (Crimea). Pompey, being unable to overtake him, took up his winter-quarters in Colchis, and founded the town of Nicopolis on the field of battle in Armenia. He then advanced against Artaxata, the capital of Tigranes, who, being abandoned by his son, and discouraged at the approach of the enemy, appeared as a supplicant before Pompey, who, pleased with his submission, called him the friend of the Romans, left him in the possession of his kingdom of Armenia, and only required a contribution of 6000 talents, and his son as a hostage. A part of the Roman army remained under L. Afranius, in the country between the Euphrates and Araxes, while Pompey with the rest marched towards the north and took up his quarters on the river Cyrus (Kur), as the season was too far advanced to approach nearer the Caucasus. Here the Romans were attacked by Orœses, king of Albania (Shirvan and Daghistan), with a numerous army; but Pompey, no way daunted, defeated him; and when the king sued for peace, it was granted him on condition that he should allow the Romans a free passage through his territory.

In the year 65 B.C. the Romans had again to sustain an attack from a king of the Iberians, between Albania and Colchis; but the barbarians were routed and put to flight, and the king sent both money and his sons as hostages to the Roman general. Pompey now proceeded to the mouth of the river Phasis (Faz, or Rion), where he was joined by his legate Servilius, who had the command of the fleet in the Euxine. From him he learned that it would be useless to force his way through the Caucasian regions to the Crimea, where his army might easily be destroyed; and therefore, on receiving information of an insurrection of the Albanians, he returned to the river Cyrus. The barbarians were easily routed, and Pompey again granted peace to their king: he determined at the same time to abandon Mithridates to his own fate, and to seek richer laurels, and which were more easily to be gained, in Syria. He received ambassadors from several Eastern princes, who saw, or thought they saw, that their fate was in his hands; and even the nearest relations of Mithridates joined the Romans, and threw open to them their fortresses. Pompey, thus assured of his own good fortune, gave to Pontus the constitution of a Roman province: his fleet however was ordered to cruise in the Euxine, and to prevent provisions being conveyed to the king in the Crimea.

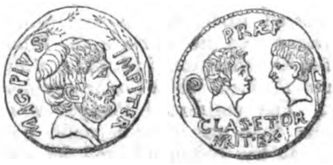
On his march southward he passed the hills of Zela, where, three years before, a legate of Lucullus had been defeated by Mithridates. Pompey ordered the bones of the slain, which still lay scattered over the field, to be solemnly buried. On his arrival in Syria he dethroned Antiochus XI., and made his country, together with Phœnicia, a Roman province. In Palestine he found a more resolute opposition. Jerusalem was distracted by a civil war between the two brothers Hyrcanus and Aristobulus: Pompey declared himself in favour of the former, and besieged Jerusalem. The town soon capitulated, but the Temple held out rather more than three months. Pompey entered the sanctuary, but did not allow his soldiers to destroy anything. Aristobulus was sent to Rome as prisoner, and Judæa recognised the supremacy of Rome by an annual tribute. In Syria, Pompey was again complimented by ambassadors from various Eastern princes: Mithridates also sent envoys, and made a last attempt at negotiation; but Pompey would hear of nothing but absolute submission, and the negotiations were broken off. Soon after, when Pompey was proceeding southward to add Arabia to his conquests, he received intelligence of the death of Mithridates; and having secured the submission of some Arabian chiefs, he hastened through Syria and Cilicia back to Pontus. Immense treasures were here surrendered to him; and Pharnaces, son of Mithridates, sent the body of his father to Pompey; but he refused to see it, and ordered it to be buried with royal honours at Sinope. Pompey now gave to Pharnaces the kingdom of Bosporus; Deiotarus, tetrarch of Galatia, was rewarded with Lesser Armenia; Bithynia, Paphlagonia, and Pontus were made a Roman province under the name of Bithynia; Cilicia and Pamphylia under the name of Cilicia and Syria. Ariobarzanes received Cappadocia, and Tigranes was allowed to remain king of Great Armenia. After he had thus settled the affairs of Asia, Pompey prepared to return to Rome, where the anticipation of his arrival called forth the activity of the several parties; some dreading his arrival with a victorious and devoted army; others, particularly the enemies of Cicero, wishing for his presence, that, as they said, he might restore the constitution, which had been violated by Cicero in his proceedings against the Catilinarian conspiracy. (Plut., *Cic.*, 23; *Cato Min.*, 26; Suet., *Cæs.*, 16.) In January of the year 61 B.C., Pompey landed at Brundusium and dismissed his armies; but he did not continue his journey towards Rome until party rage had subsided. He was everywhere received with enthusiasm, and the greater part of the population of Rome left the city to meet him before the gates, where he was solemnly received by the senate. After an interval of some months, he celebrated his triumph over the pirates and Mithridates, the most magnificent that Rome had ever beheld. Large tables were carried before him, containing an account of the countries and princes that he had subdued; and of the ships, treasures, and prisoners he had gained for the republic an immense train of waggons followed, loaded with the spoils of the East. On the second day the imperator himself entered the city, and before his chariot walked the most distinguished of his prisoners, 324 in number, and behind him followed his legates and military tribunes. His army took no part in the triumph. (Appian; Dion Cass., xxxvii. 24.) After the triumph was over, Pompey dismissed his prisoners to their native countries, with the exception of young Tigranes and Aristobulus; and with his spoils he built a temple to Minerva, with inscriptions to commemorate his victories.

After his triumph, he naturally expected that all his measures in Asia and the distribution of lands which he had promised to his soldiers would be sanctioned by the senate, especially as he thought he was secure of the support of L. Afranius, whom he had promoted to the consulship. But he found himself not only opposed by Cato and the heads of the senatorial party, but abandoned by the cowardly Afranius. This blow was too severe for a man like Pompey to bear, and he now openly joined the popular party, a step which he could not safely retract, and which involved him in those difficulties in which he at last perished. Cæsar, who was sure that he could not be outstripped in the affections of the people, supported Pompey, and thus at once weakened the power of the aristocracy, and gained over Pompey to his own interests. Crassus, the wealthiest of the Romans and the friend of the senate, was also easily gained over, and these three men now formed what is generally called the first triumvirate. During his consulship, Cæsar (59 B.C.), by his Agrarian law, enabled Pompey to fulfil the promises which he had made to his veterans: large districts of public land in Campania were assigned to them. Cæsar at length also obtained for him the sanction of the arrangements he had made in Asia before he left it. Pompey in his turn was obliged to support Cæsar, his apparent friend, in all his designs, and thus he rendered himself more and more obnoxious to the aristocratic party; while on the other hand he was neither himself sincerely devoted to the people, nor regarded by them with any other feeling than astonishment for his military success. As Pompey had divorced Mucia (Cic. *ad Att.*, i. 12) the mother of his two sons, Cæsar, to secure him still more, gave him his daughter Julia in marriage, with whom Pompey spent most of his time during this period in his villa of

Albanum near Rome, unconcerned about the sufferings of his great eulogist Cicero, who was driven into exile by the tribune Clodius; and it was not until Clodius had made an attempt to assassinate Pompey that he promoted the recall of Cicero. Gratitude induced Cicero to endeavour to re-establish Pompey in the popular favour, by procuring for him the præfectura annonæ for five years, and the proconsular power over all provinces, with fifteen legions at his command. (Cic., *Ad Att.*, iv. 1; Dion Cass., xxxix. 9.) In this capacity he went to Sicily, whence he sent provisions to Rome, and the favour of the people was easily gained, as the price of corn immediately began to fall. At the commencement of the year 56 B.C., Pompey returned to Rome, where he exerted his influence for the restoration of Ptolemæus Auletes, king of Egypt, who had been expelled from his kingdom. Clodius, who had become curule ædile, accused Milo; and when Pompey defended him, he was loaded with abuse by Clodius. This affair also involved him in a contest with the tribune Cato, who attacked him in the senate, and accused him of faithlessness to Cicero. The silence of the audience inflamed Pompey's anger, and he openly spoke of secret conspiracies against himself, pointing out his colleague Crassus as their author. He was now conscious of having lost the favour of all parties, and saw nothing left but to repair to Cæsar, who had taken up his winter-quarters at Luca, and to whom Crassus had already gone. Cæsar reconciled the two men, and, about the middle of April, 56 B.C., concluded a secret treaty with them, according to which his own governorship of Gaul was to be prolonged for five years, and Pompey and Crassus to be made consuls for the following year, with the provinces of Spain and Africa for Pompey, and Syria for Crassus. He moreover promised to exert all his influence with the people in their favour.

Pompey now returned to Rome with renewed courage and arrogance, and with Crassus was a candidate for the consulship. The opposition, headed by the inflexible Cato, who saw through the plans of the triumvirs, was fierce, though useless; but when the day of election came, it was only after the forum had been occupied by armed forces that Pompey and Crassus attained their object. The tribune Trebonius was bribed to assign to the new consuls the provinces on which they themselves had already determined. Pompey, now again at the head of the Roman world, indulged in vain dreams of a final victory over his rivals, not possessing penetration enough to see that he was preparing his own ruin, and that Cæsar was only using him as an instrument for the accomplishment of his own objects. Pompey built a magnificent theatre, and amused the multitude for several days with the most gorgeous spectacles. But the result did not entirely answer his expectations, and when he shortly after raised troops in Italy and Cisalpine Gaul, and sent them to Spain under his legates Afranius and Petreius, the people loudly expressed their discontent. At the end of the year Crassus went to Syria, but Pompey governed his province by his legates, and remained with his army in the neighbourhood of Rome, ostensibly to provide the city with provisions, but the fact was that he thus hoped to obtain dictatorial power, and to disarm Cæsar through the senate and the people without striking a blow. He interfered with the administration of justice, prevented the election of new consuls, and secretly kept up hostilities between the parties at Rome. In September of the year 54 B.C., his wife Julia died, and when proposals were made for a new alliance with the family of Cæsar, he rejected them. Crassus in the meanwhile perished in Asia, and the triumvirate was changed into a duumvirate. Pompey had long wished for the dictatorship, and when the tribunes Lucceius Hirrus and Cœlius Vinicianus prevented the elections, and at last proposed to make Pompey dictator, he was obliged openly to come forward, but perceiving the vehement opposition of the senate and Cato, he withdrew, and Domitius Calvinus and Valerius Messala were elected consuls for the remainder of the year. At the end of their consulship, the elections were again disturbed, and Pompey conceived fresh hopes. In the ensuing quarrels between Milo and Clodius [CICERO], the senate, unable to maintain peace and order in the city, empowered Pompey to collect troops, and to put an end to the disturbances. Pompey was now again in his proper sphere: his first object was, with the assistance of his soldiers, to thwart the plans of Milo, and to get rid of him he not only introduced new forms of procedure, but also surrounded the court with soldiers during the trial of Milo. Milo was exiled, while others who were equally guilty were acquitted, as Pompey had no ground for fearing them. On the 25th of February, Pompey was made sole consul, but on the 1st of August he made Metellus Scipio, whose daughter Cornelia he had married, his colleague, and with him held the comitia to elect the consuls for the year following. At the same time an old law, that in many instances had been neglected, was renewed, which required that every candidate for a public office should be a candidate in person at Rome. This was manifestly aimed at Cæsar, who thereby would be compelled to give up the command of his armies and to appear in Rome, if he wished to be a candidate for the consulship. For himself Pompey obtained a prolongation of his proconsulship over Spain for five years. While Pompey, during whose illness at Naples all Italy prayed for his recovery, was more and more confirmed in his conviction that he was the first man of the republic, Cæsar had by the distribution of large sums of money increased his party at Rome, and gained over to his interest several tribunes, among whom was the bold and eloquent Curio. Cæsar, though absent from Rome, claimed to be elected consul for the following year; and when Pompey and the senate required him to dismiss his army and present himself at Rome as a candidate, Curio insisted that Pompey should likewise dismiss his army. [CÆSAR.] After long discussions, the party of Pompey gained the day, and a decree was made declaring Cæsar a public enemy unless he resigned his command and came to Rome as a private man. The public authorities at the same time received orders to guard the republic against any danger, and Pompey was allowed to make use of the public treasury for the purpose of raising an army in Italy. Pompey had declared that he only needed to stamp with his foot upon the earth to call forth new legions; but when he found that he had miscalculated, he and the whole senatorial party were thrown into the greatest confusion by the intelligence that Cæsar was advancing towards Rome. On this occasion Cicero exclaimed, 'Pompey, thou hast betrayed us!' Cato however thought it advisable to declare Pompey general of the republic. Pompey with his few troops could do nothing; he left the city accompanied by the consuls, most of the senators, Cato, Cicero, and others of the aristocratic party; they hastened to Capua, and thence to Brundusium. The consternation among those who were obliged to remain in the city was indescribable; they dreaded a renewal of the scenes that they had witnessed under Marius and Sulla. But Cæsar by his moderation won the hearts of all. From Brundusium Pompey fled to Dyrrhachium in Epirus, which he strongly garrisoned and fortified, while Cæsar established his power in the West. The position of Pompey was more advantageous to him than any other he could have chosen, for the fleet was at his command, and he could raise new troops without great difficulties; but he had to struggle with his own party, some blaming him for not offering battle to Cæsar, and others for not accepting the proposals of peace which Cæsar repeatedly made to him. His own plan was to weaken his enemy without fighting a battle. But Cæsar received reinforcements from Italy, and Pompey was cut off from Dyrrhachium; in a battle which ensued, Cæsar was defeated, and directed his march into Thessaly. After this success, the senatorial party imagined that all the work was done, and that they might without any danger return to Italy; and when Pompey declared that Greece must first be cleared of the enemy, they urged the immediate necessity of battle. Cæsar knowing this disposition of his adversaries, compelled them, on the 9th of August, 48 B.C., to give battle in the plains of Pharsalus. Pompey was defeated, and though he had still considerable forces at his command, he was disheartened. He fled to the mouth of the river Peneus, and thence sailed to Lesbos, whither he had sent his wife Cornelia and his younger son. By the advice of one of his friends he determined to seek refuge in Egypt, whose king was indebted to him for the restoration of his father. He landed there on the 28th of September, but was treacherously murdered in the presence of the king and his army by the tribune Septimius, at the instigation of Achillas and Theodotus, who feared the anger of Cæsar. The wife and child of Pompey, who were still on board the ship, and saw the murder, hastened away. The murderers cut off the head of Pompey and left the body on the beach, where it was buried by a freedman and a veteran. Cæsar, who arrived in Egypt three days later, shed tears at the sight of the head of Pompey, and put his murderers to death.

Pompey was 58 years old at the time of his death. It is difficult to form a correct judgment of his character, for he was not, like Marius, Sulla, and Cæsar, a man of singleness of principle and purpose, but he changed his position according to the circumstances in which he was placed, and which he was unable to control. Though by birth not belonging to the senatorial party, he was by his immense fortune placed on a level with them, and made himself their champion, though they could never sympathise with him; for the people he had no heart, and when he joined the popular party, it was solely to satisfy his own ambitious views. He was thus in reality throughout his life floating between two parties, and was neither in his private nor public life a faithful friend. His only object was to be looked upon as the first man of the state, and he objected to no means of accomplishing this end, even though they tended to subvert the constitution. In his civil administration of the state, and during the whole period from his great triumph to the war with Cæsar, the little that he did was not calculated materially to improve the condition of his country. Ambition and vanity were the leading features of his character, and a calculating selfishness pervaded everything that he did. His real fame must rest on his conduct as a general, though he was inferior in this respect to most of the great generals of his age. In his private life he formed indeed a contrast with most of his contemporaries, for though immensely rich, he lived simply, abstained from all debauchery and excesses, and was faithful in his matrimonial relations. It is also generally acknowledged that he did not enrich himself by extortion in his provinces, though no man had ever had more opportunities, and that he was conscientious in the application of the public money. As regards his intellectual powers, he was not above mediocrity, although he sometimes affected to be the patron of science and literature. Cicero judged of him differently at different times, according as he was governed by momentary impulse or by what he considered the good of the state. His features in his statues and busts are, according to Niebuhr, expressive of a high degree of vulgarity and rudeness: others think them majestic and imposing. (See the articles CICERO, CÆSAR, SERTORIUS, MITHRIDATES, and especially Pompey's Life in Drumann's *Geschichte Roms, &c.*, vol. iv., p. 324-556.)



British Museum. Actual Size.

This coin was not struck by Pompey himself, but by his son Sextus, as appears from the surname *Pius* in *Magnus Pius, Imperator iterum, Præfectus classi et oræ maritimæ ex Senatus consult.* It must have been struck at the time when Sextus had taken possession of Sicily and assumed the title of Imperator for the second time. The single head on one side is that of Pompey the Triumvir; the two smaller heads are those of his two sons. But there are still some difficulties:—1. The hair in this portrait of the father seems to fall smoothly down the forehead, though Plutarch says that, on the contrary it was bristly and rose upwards, as is seen on one of the smaller heads. 2 The *lituus* is not easily accounted for, as neither of the sons ever held the office of augur. The portrait of Pompey is also found on the coins of Pompeiopolis, which town honoured him as its founder. Comp. Eckhel, 'Doctr. Num. Vet.,' iii., 69, and Vaillant, *v.* 'Pomp.'

POMPEIUS, CNEIUS MAGNUS, the elder of the two sons of the triumvir Pompey and of Mucia. He was born about 77 B.C. According to Appian, he and his brother Sextus accompanied their father on his expedition against the pirates. When the war with Cæsar broke out, he was sent to Egypt to collect troops, and when he returned to his father's fleet in the Adriatic with 500 horsemen and 50 ships, and found that Cæsar had been allowed to cross the Adriatic, he felt very indignant and burnt several of the hostile ships. After the defeat of his father, he sent his squadron back to Alexandria and remained with the main armament near Corcyra, justly observing that with such a fleet there could be no reason for despair. In the spring 47 B.C., when sailing with the fleet to Africa, he was informed by his brother of the murder of his father. The aristocratic party, whose interests were now distinct from those of the family of Pompey, did not wish young Cneius Pompey to be among them in Africa, and sent him to Spain, where he might prepare for them a refuge if they should be unsuccessful in their contest. Cneius, after having taken possession of several small islands, landed in Spain (46 B.C.), where he was shortly after joined by his brother Sextus, who had left Africa after the defeat of the senatorial party at Thapsus. Cneius soon collected an army of 13 legions, but Cæsar did not at first think him an adversary of any consequence, and sent only his legate C. Didius against him. At the end of the year however he found it necessary to follow himself. On the 17th of March, 45 B.C., Cneius was defeated in the bloody battle of Munda (Monda in Granada), and flying to Carteia, attempted to escape across the sea. Being thwarted in this attempt, he directed his steps towards the interior of Spain. His enemies followed, and overtook him in the neighbourhood of Lauron, where he was killed. Being naturally of a passionate disposition, the fate of his father had filled him with an insatiable desire of revenge, and changed his natural boldness into a kind of savage audacity. See the article CÆSAR, and the detailed account of the war in Spain in the book *De Bello Hispaniensi.*

POMPEIUS, SEXTUS MAGNUS, the younger son of the triumvir and of Mucia, was born in 75 B.C. At the time of the war with the pirates he was a boy of eight years of age, and when his father fought the battle of Pharsalus he was with his stepmother Cornelia in Lesbos. After witnessing the murder of his father in Egypt, he fled with Cornelia to Cyprus, and soon after joined his brother Cneius, who was sailing with the fleet to Africa. When the senatorial party was defeated at Thapsus, he went with Labienus and others to Spain to rejoin his brother, but stopped at Corduba. After learning the unhappy issue of the battle of Munda, he left Corduba, and for a time wandered about as a robber in the country of the Lacetani. A number of malcontents and fragments of the army of his brother soon assembled around him, and with them he began to carry on a kind of guerilla warfare. Supported by the natives (Dion Cassius, xlv. 10), he took several towns, and neither C. Carrinas nor Asinius Pollio was able to cope with him. He soon made himself master of all Bætica and a part of Hispania Tarraconensis, and assumed the title of imperator. The only object of Sextus, as he himself afterwards declared, was to be restored to his country and to recover the confiscated estates of his father. (Cic., *Ad Att.*, xvi. 4.) It was proposed in the senate to recall him and to give him from the public treasury a sum of money equivalent to the property of his father. The proposal was supported by Antony; but Sextus, mistrusting the optimates as well as the veterans of Cæsar, advanced with his forces as far as Massilia to watch the course of events in Italy. The senate made him chief admiral of the fleet, but when Octavian, Antony, and Lepidus formed a new triumvirate, Sextus was declared an outlaw. Being however supported by his fleet, he cruised as a pirate in the Mediterranean, and at last succeeded in taking possession of Sicily. The number of proscribed or ruined individuals and of slaves who flocked to his standard increased daily, as he promised them higher rewards than his enemies offered for his head. He also received reinforcements from A. Cornificius, governor of the province of Africa. (Dion Cass., xlviii. 17.) Rome at this time suffered from scarcity, and Octavian sent out Q. Salvidienus Rufus (42 B.C.) with a squadron, who however only succeeded in protecting the coasts of Italy. During the campaign of Philippi, Sextus remained inactive, confining himself to the defence of Sicily, and only harassing the coasts of Italy, whereby he increased the scarcity of provisions at Rome. When, in the spring of the year 40 B.C., Antony on his return from Egypt found the gates of Brundusium closed upon him by Octavian, he requested Sextus Pompey to assist him against Octavian. Pompey without hesitation sent a division of cavalry and a squadron to southern Italy. But the triumvirs soon became reconciled, and after concluding a fresh treaty among themselves (fœdus Brundusinum), they determined to make war upon Pompey, who now recommenced cutting off all supplies from Rome. The city was thus thrown into such a state of suffering and discontent, that at last the people in open rebellion compelled the triumvirs to a reconciliation with Pompey. In 39 B.C. a treaty was concluded with him, in which he obtained the proconsulship of Sicily, Sardinia, Corsica, and Achaia, and promised to supply Italy with provisions. But this reconciliation proved to be little more than a farce, for when Sextus returned to Sicily, Antony refused to give up Achaia, and Octavian complained that Pompey allowed piracy to be carried on in the Mediter ranean. A rupture between Pompey and Octavian ensued, and Menodorus, the admiral of the former, went over to Octavian, and treacherously surrendered to him Sardinia and Corsica. Octavian was now bent upon destroying the Pompeian party, but his fleet was twice defeated by the admirals of Pompey, first near Cuma and then near Messina. Pompey however, as usual, did not avail himself of his victories, and allowed Octavian to repair his losses. The faithless Menodorus now returned with seven ships to his former master. M. Vipsanius Agrippa was appointed by Octavian as chief admiral of his fleet, and a landing was to be made on three parts of the island of Sicily at once; but the fleet was dispersed by a storm, and Lepidus alone reached Lilybæum. Pompey even now remained inactive, and offered sacrifices to Neptune, whose son he called himself. (Dion Cass., xlviii. 19; Horat., *Epod.*, 9.) Menodorus again deserted Pompey, and in a sea-fight off Mylæ against Agrippa, Pompey lost 30 ships and was unable to prevent Octavian from landing at Tauromenium. After several skirmishes, Agrippa at length (36 B.C.) in a great sea-fight near Naulochus decided the fate of Pompey, who, when he heard of the desertion of his land-troops, fled with his daughter and 17 ships from Messina to Asia. He was not followed by Octavian, and found an hospitable reception with C. Furnius, the legate of Antony. But he soon lost the confidence of his host by sending secret envoys to the Parthians and taking possession of Lampsacus. An open war broke out between him and Furnius, and when Antony, who was at the time in Alexandria, heard of it, he sent Titius with a fleet of 120 ships against the dangerous guest. Pompey fled to Armenia, but being overtaken by his enemies and deserted by his troops, he surrendered, and was put to death at Miletus (35 B.C.), either at the command of Antony himself or of Titius, who wished to remove a man who might easily be the cause of a rupture between the triumvirs.

Sextus Pompey was 40 years old at the time of his death. He had been deprived of all that was dear to him, and was drawn into a war which he would willingly have avoided, if he could have been restored to his country and could have recovered his property without it. In his undertakings he owed almost all his success to favourable circumstances and to the great reputation of his name, for he himself was neither active nor prudent. (Vel. Pat., ii., 73, 79; Cic., *Ad Att.*, vi. 4.) He assumed the name of Pius, because he endeavoured to avenge the death of his father and his brother: this surname appears on many of his coins. [Pompeius, Cneius.]

POMPEIUS, TROGUS. [Trogus.]

POMPEY'S PILLAR. [Alexandria.]

POMPILUS, according to Latreille, a genus of Hymenopterous insects of the section Fossores and family Sphegidæ. In the systems of Dr. Leach, Mr. Shuckard, and some others, this group of insects is regarded as a family, Pompilidæ, the principal characters of which are as follows:—posterior legs at least as long as the head and thorax taken together; antennæ of the female formed of long joints, generally distinct and often curved; prothorax at least as broad again as long; its posterior margin arched; abdomen obovoid, without any long petiole at the base.

The Pompilidæ are extremely active: they run and fly with great rapidity, are for the most part of moderate size, and often adorned with red and black colours;—at least those species which belong to the genus *Pompilus*. These insects burrow in the ground, preferring sandy situations, and store their cells with spiders, which constitute the food of their larvæ.

In the genus *Pompilus*, the superior wings have one marginal cell, which is semicircular, and sometimes nearly triangular; and three submarginal cells; the first of these is as long or longer than the two following cells; the second receives the first recurrent nervure about its centre; and the third, which is either triangular or subquadrate, receives the second recurrent nervure. A fourth submarginal cell is sometimes traceable.

This genus contains numerous species. Mr. Shuckard, in his work on the indigenous Fossorial Hymenoptera, describes eighteen species.

Besides Pompilus proper, the genera *Ceropales* and *Aporus* are included in the present family. An account of these genera and of the English species they contain will be found in Mr. Shuckard's work.

POMPION. [Pumpkin.]

POMPONIUS SEXTUS, a distinguished Roman jurist. His age may be approximated to from several circumstances. He is supposed to be the Sextus mentioned by Gaius in connection with Julianus (ii. 218). In the extract from the 'Liber Singularis' of the 'Encheiridion' of Pomponius (*Dig.*, i., tit. 2, s. 2), we have a list of the various Roman jurists, ending with Salvianus Julianus, from which circumstance it may be concluded that he was at least younger than Julianus. A difficulty however arises from the fact of a Pomponius being often cited by Julianus (*Dig.*, iii., tit. 5, s. 6), and from there being cited in the 'Digest' both a Sextus Pomponius and a Sextus and a Pomponius. (*Dig.*, xxx., tit. 1, s. 32.) Sextus Pomponius is cited by Pomponius. (*Dig.*, xxviii., tit. 5, s. 41.) On the whole it seems likely that there was a Pomponius and a Sextus Pomponius who was sometimes simply called Sextus. But if there were two, it is difficult to say when they respectively lived or what they respectively wrote. Pomponius survived the emperor Antoninus Pius. (*Dig.*, l., tit. 12, s. 14.) In one passage he calls Gaius (*Dig.*, xlv., tit. 3, s. 39) 'Gaius noster.' From all these circumstances it may be concluded that a Pomponius lived under Antoninus Pius and survived him. If there was a Sextus Pomponius, he was older than Pomponius. The works of Pomponius, as cited in the Florentine Index, are thirty books 'Ad Q. Mucium Lectionum,' thirty-five to Sabinus, twenty books of Epistolæ, fifteen books of Variæ Lectiones, seven books to Plautius, five books of Fidei-commissa, five books of Senatus consulta, five books of Regulæ, and two books of the Encheiridion.

The 'Encheiridion,' as extracted in the 'Digest,' is called 'Liber Singularis.' It contains an historical sketch of the origin and progress of the Roman law, and a list of the law writers to the time of Pomponius, in which it is also mentioned what writers respectively belonged to the schools of Ateius Capito and Labeo, who lived in the time of Augustus, and were the founders or heads of two separate schools (scholæ).

POMPONIUS MELA. [Mela.]

POMPTINE or PONTINE MARSHES (*Paludi Pontine*, in Italian) is the name of a low marshy plain in the Papal State, about 24 miles long from north-west to south-east, from For. Appio to Terracina, and varying from eight to ten miles in breadth. It is bounded on the east by the Monti Lepini. On the west it is bounded by a range of downs from 30 to 60 feet high, which begin on the south at Mount Circeo, an insulated calcareous mountain 1600 feet high, which juts out into the sea, and thence run to the northwards parallel to and at the distance of from two to three miles from the coast, leaving a belt of land between them and the sea, which is partly covered by forests and partly occupied by lagoons. This belt has no water communication with the basin of the Pomptine marshes. From Mount Circeo eastward to Terracina, another ridge of downs of much smaller dimensions runs close to the sea-coast, and is cut through by the canal called Portatore di Badino, which is the great outlet of the waters of the Pomptine marshes. On the north and north-west the Pomptine marshes border on the dry plains of Cisterna and Sermoneta, from whence the general slope of the surface is to the south-east, in the direction of the length of the marshy plain, on one side of which the ground rises gently towards the Lepini ridge, and on the other towards the terrace or downs above mentioned. The greatest depression is towards the south-east extremity, where an extent of about three or four square miles is below the level of the sea. All the rest of the surface of the plain is above the sea-level, being about 18 feet at For. Appio at the north-west or upper end of the marshes, and declining gradually along the centre of the plain, until it is only five feet at the point where the waters flow into the canal or æstuary of Badino.

The rivers which flow into this basin are, beginning from the north,—1, La Tepia, a muddy stream which rises in the heights of Giuliano and Cori, east of Velletri; 2, the Ninfa, which has its source at the foot of the mountain on which Norma is built; 3, the Cavata, which issues out of a small lake near Sermoneta; 4, the Ufente, a clear perennial stream which rises at the foot of the Monti Lepini, near Casenuove, not far from Sezze; 5, the Amazeno, which rises in a deep valley of the Monti Lepini, called Vallecorsa, and drains a considerable tract of country before it enters the Pomptine plain by a narrow defile below Piperno; 6, the Pedicata, a smaller stream which rises in the mountains of Sonnino. The French engineer Prony demonstrates in his able work (*Description Hydrographique et Historique* *des Marais Pontins*, 4to., with an Atlas, Paris, 1822), that one-half at least of the water which flows into the plain of the Pomptine marshes is derived from subterraneous drainings of the more elevated neighbouring basins of the Sacco, the Liris, and the Anio, as the average quantity of rain which falls upon the whole extent of the Pomptine basin is not equal to one-half of the quantity of water which finds its way into the sea through the æstuary of Badino. The river Ufente alone, which issues out of a rock, having no apparent upper basin or drainage to feed it, is sufficiently large to turn mills and bear loaded boats near its source.

There is every appearance that the basin of the Pomptine marshes was once a gulf of the sea, which has been gradually filled up by alluvium from the mountains. The oldest historical records exhibit this tract as occupied by the Volsci, who had numerous towns, some of which were situated in the most marshy part of the country. One of these towns, called Suessa Pometia, which was destroyed by Tarquin the Proud, is supposed to have given its name to the whole region. The country was evidently very fertile, for we read in Livy (iv. 25) that in the year 322 of Rome the Romans in a season of scarcity sent to the Pomptine ager for a supply of corn. In the years 367-8 the tribune L. Sicinus proposed a distribution of the lands of that district among the poorer citizens. About 442 of Rome, the censor Appius Claudius Cæcus constructed the fine road which still bears his name across the length of the Pomptine region, the soil of which must have then been sufficiently compact to bear the great weight of the causeway. The level of the original ground on which it was constructed has been found to be about four feet above the sea-level, at a distance of 12 miles from the coast. But on arriving at the foot of the rock of Feronia, Appius found that if he continued the road in a straight line, he must pass through a soft marshy tract, and he was induced to deviate from the direct line in order to avail himself of the more solid ground which lay near the foot of the Monti Lepini. At some period of the century and a half that followed the building of the Appian way, the country seems to have undergone great deterioration, either from natural or civil causes, and to have become partly inundated, for we find the consul Cornelius Cethegus, in the year of Rome 592, applying himself to the draining of the marshes and restoring the land to cultivation, and it was then that new towns arose on the ruins of the antient towns of the Volsci, under the names of Tres Pontes, Tres Tabernæ, ad Medias, &c.

The civil wars and the devastation which accompanied them again caused the hydraulic works of the Pomptine marshes to be neglected, until Augustus made or restored several canals, especially a navigable canal which followed the line of the Via Appia, and upon which Horace performed part of his journey to Brundusium (*Sat.* i. 5). Nerva and Trajan restored parts of the Via Appia which had sunk, and Antoninus Pius constructed a port at Terracina. After this we find no more records of the Pomptine marshes till the reign of Theodoric, who turned his attention to the draining of this tract, and charged a patrician named Cæcilius Decius with the execution of his orders. After that epoch we know no more of the state of the country until the end of the thirteenth century, when Pope Boniface VIII., whose family, the Caetani, were feudal lords of Sermoneta and of the greater part of the Monti Lepini, constructed some works for the drainage of part of the marsh. Leo X. employed the engineer Giovanni Scotti to repair and enlarge the canal of Badino, which is the great outlet of the marshes. Sixtus V. constructed a lateral canal, which, running nearly parallel to the Via Appia, receives the waters of the western part of the marshes and carries them to the common æstuary of Badino. This canal is still called Fiume Sisto. Notwithstanding this, the Pomptine marshes were in a deplorable state when Pius VI. ascended the pontifical throne in 1774. All the canals were encumbered with mud, about 60,000 acres were under water, the Via Appia was covered with alluvium and aquatic plants, and a few sickly fishermen were the only inhabitants of the region. Lalande, in his 'Voyage en Italie,' gives a lamentable description of the appearance of the country in 1766. In 1777 Pius VI., after having consulted Boscovich, Ximenes, Manfredi, and other mathematicians, entrusted the draining of the Pomptine marshes to Rapini, an engineer of Bologna, who had acquired a reputation by his hydraulic labours in the territory of his native town. The pope began by purchasing that part of the ground which was entirely covered with water from those who had prescriptive rights to it. He then suggested to Rapini, in a letter dated 17th of January, 1777, that the best plan of drainage would be by digging a capacious canal along the whole length of the marshes parallel to the line of the antient Appian road, which should be restored at the same time. In 1778 the works began. Rapini began by clearing the canal of Badino as far as where it meets the Via Appia, and he then began to excavate a canal parallel to that road. As he proceeded on his work, which could only be carried on during the winter and spring months on account of the pestilential air of the summer months, he had the satisfaction of seeing the waters lower, and the old causeway of the Via Appia, with its arches and bridges, emerge from the stagnant lagoon in which it had been buried for ages. From seven to eight thousand workmen were employed for more than three years, and at last, in 1781, the excavation of the canal was carried as far as Forum Appii, at the upper extremity of the marshy regions. The canal, thus opened in a straight line of about 14 miles long, was appropriately named 'Linea Pia.' It is from 40 to 50 feet wide and 9 feet deep, and is embanked the whole length.

Rapini afterwards cleared the lateral or western canal, called Fiume Sisto, and introduced into it the waters of the Ninfa and of the Tepia from the upper part of the marshes. This important canal, which describes a curve of nearly 30 miles in length, is from 20 to 30 feet wide.

In the eastern part of the marshes a new bed was dug and embanked for the river Ufente, and was made to join the Amazeno at Ponte Maggiore, after which the united stream joins the Linea Pia. Two other canals, called Schiazza and Botte, were excavated parallel to the main canal, with cross cuts at the distance of one mile each, which open into the Linea Pia so as to drain the intermediate space.

Lastly, a branch of the Portatore, or great emissary, was made to run into the port of Terracina in the shape of an embanked and navigable canal. All these works, which lasted about fifteen or sixteen years, cost Pius VI. only nine millions of francs, or 360,000*l.* sterling. Rapini having died, his son-in-law Astolfi continued the works; but unfortunately the state of the papal treasury and the confusion resulting from the French revolutionary invasion prevented their completion. Some years after, when Napoleon took possession of the Papal State, a commission was appointed to superintend the hydraulic works of the Pomptine marshes, and 200,000 francs were granted annually for the purpose of draining them. A fresh embankment of the Amazeno, a rapid current, was effected, and the intermediate canal of Schiazza was lengthened, in order to drain more effectually the space between the central line and the Monti Lepini. With regard to the western portion of the marshes, several engineers advised that advantage should be taken of a colossal excavation called traditionally Rio Martino, but which probably dates from the Roman times. This canal is cut across the western downs, and affords a direct communication between the middle part of the marshes and the sea; it is about 5000 feet long, from 60 to 100 feet wide, and about 40 feet deep. By clearing and continuing this excavation to the sea, it was proposed to make it the common emissary of the Tepia and other streams which flow through the upper or north-west part of the marshes, and which are now apt to encumber the canal called Fiume Sisto with their deposits. But Prony objected to this plan, because he thought it necessary not to diminish the current of water which runs out through the æstuary of Badino. Consequently the Rio Martino has remained useless. Since the Restoration, all that has been done for the Pomptine marshes has been to maintain the drainage in the state in which Pius VI. left it, by keeping the canals clear and the dykes in repair. The greater part of the plain is covered with rich pastures, in which are fed numerous herds of horned cattle, and other parts of it are sown with rice, wheat, and Indian corn, and afford rich crops. In the spring, before the great heat renders the atmosphere unwholesome, it has the appearance of a most delightful region. But, except the post stations along the high road, and some scattered huts here and there, there is no permanent population throughout the whole of the plain. The great æstuary of Badino is between 70 and 80 feet wide; there is about 4 feet water over the bar, and nearly 10 feet water inside of it, where boats find a safe anchorage.

Further details concerning this interesting country are found in the works of Prony; Nicolai, *Dei Bonificamenti delle Terre Pontine;* Bolognini, *Memorie dell' antico e presente Stato delle Paludi Pontine;* and Tournon, *Etudes Statistiques sur Rome.*

PONANG. [Hindustan, vol. xii., p. 204.]

PONCE DE LEON, RODRIGO, born in 1443, was an illegitimate and younger son of John Ponce de Leon, Count of Arcos, a Castilian nobleman, and Doña Leonora Nuñez de Prado, a lady of rank. The brilliant qualities of the youth so far gained him the affection of his father, that he asked and obtained the royal sanction to bequeath him his title and estates, to the prejudice of legitimate heirs. He served his apprenticeship to the art of war in the various campaigns against the Moors, displaying on every occasion the greatest ability and personal courage. When scarcely seventeen years old, he obtained at Madroño a victory over the Moors, accompanied with a signal display of personal prowess. Having stopped to adjust his buckler, which was unlaced, he was suddenly surrounded by a party of the enemy; he however snatched a sling from one of them, and made so good a use of it, that after disabling several, he compelled the rest to take to flight; for which feat of arms the king complimented him with the title of the youthful David. At the death of his father, in 1469, Rodrigo succeeded him in his title, and soon after married the daughter of the Marquis of Villena, the minister of Henry IV., through whose influence he was raised to the dignity of Marquis of Cadiz. This alliance attached him to the fortunes of Henry, in his disputes with his brother Alfonso, and subsequently with Isabella, on the accession of the latter to the throne of Castile. Rodrigo did not engage in any open act of resistance; but retired to his estates, and occupied himself entirely in prosecuting an hereditary feud with the house of Guzman, a family which from antient times divided with his own the interests of Andalucia. In the glorious wars which put an end to the Mohammedan power in the Peninsula, the marquis took a very active part. Having early in 1482 received intelligence that the important fortress of Alhama was but slightly garrisoned, he marched up to it, and succeeded in scaling the walls and surprising the garrison. In 1483, he accompanied a marauding expedition against Malaga, headed by the grand-master of Santiago, Don Alonso de Cardenas, who entrusted to him the command of the centre; but being suddenly attacked and surrounded by considerable forces of the enemy, whilst in the intricate passes of the Axarquia, the Christian army was completely routed, and very few knights escaped alive. The marquis, after performing prodigies of valour, succeeded in extricating himself from the peril, and escaping with a few followers. During the siege of Velez (April, 1487) he saved the life of Ferdinand, who, having been surrounded by a party of the enemy, must inevitably have perished without his timely aid. He also greatly distinguished himself during the siege of Malaga (May, August, 1487) by repulsing a sally made by the garrison, and he was present at the surrrender of Baza (1488) and Granada (January, 1492). This gallant soldier survived only a few months the close of the Moorish war, to which he had so efficiently co-operated. He died in his palace at Seville, on the 28th of August, 1492, from the effects of a disorder brought on by the fatigues of his military life. At his death, Ferdinand and Isabella, with all their court, went for several days into deep mourning.

(Bernaldez, *Cronica de los Reyes Católicos, Genealogia de los Ponces de Leon;* Prescott, *Ferdinand and Isabella.*)

PONCE DE LEON, JUAN, one of the early Spanish discoverers in America, was a native of Leon in Spain, and when a boy was page to Pedro Nuñez de Guzman, Señor of Toral. From an early age he had been schooled to war, and served in the various campaigns against the Moors of Granada. He accompanied Columbus in his second voyage in 1493; and having subsequently distinguished himself in the campaign against the Indians of Higuey, he was appointed to the command of the conquered territory, as lieutenant of the governor of Hispaniola. In 1508, having received intelligence from the natives that the mountains of the neighbouring island of Boriquen, or Puerto Rico, abounded with gold, he applied to the governor Ovando for permission to make an expedition to the island, and having obtained it, sailed thither, in a caravel, with a few Spaniards, and several Indians to act as interpreters or guides. Ponce landed near the residence of the principal cacique, Agueybaná, who treated him and his suite with great kindness, and gave them a large quantity of gold. With these good tidings Ponce returned to Hispaniola, and obtained from the governor permission, as well as the necessary supplies, to undertake the subjugation of the island. Before the supplies were completed however, his patron Ovando was recalled, and succeeded by Don Diego Columbus, who deprived Ponce of his command, and appointed another governor over the island. In the meanwhile Ovando, who had now returned to Spain, having made a favourable representation of his merits, Ponce was re-appointed in 1509, and entrusted with the conquest of the island. After many hard-fought battles with the natives, who proved to be far more warlike than those of Hispaniola, and the death of their cacique Agueybaná, who fell in a skirmish, Ponce completed the subjugation of the island; notwithstanding which he was again deprived of the command, and replaced by Juan Ceron. Incapable of quiet life, Ponce soon turned his eyes to some other scene of conquest. He appears to have conceived the singular idea that there was yet a third world to be discovered, and he hoped to be the first to reach it; but as he was then fast advancing in life, and his constitution had been very much impaired by the fatigues and privations of former voyages, he decided to sail first to a certain island of the Bahama group, called Bimini, where, according to a tradition current among the natives of Puerto Rico, was a fountain possessing the power of restoring youth. In search of this marvellous fountain Ponce sailed, on the third of March, 1512, from the port of St. Germain in the island of Puerto Rico. Having arrived at the Bahamas, he visited all the islands, one after another, and drank of every fountain, river, or lake that he found; but his inquiries for the island of Bimini were all in vain. Ponce however was not discouraged; and after repairing his ships, he again put to sea, and shaped his course to the north-west. In this way, on Sunday, the 27th of March, he came in sight of what he supposed to be an island, which, from the circumstance of its being discovered on a Palm Sunday, and the ground being covered with flowers, was called 'Pascua Florida.' Ponce took possession of the country in the name of Ferdinand and Isabella, and again started in search of the desired island; but after some months of unsuccessful cruise, he returned to Puerto Rico, and thence to Spain, where he arrived in 1513. Having made a report of his voyage to the king, he was appointed Adelantado de la Florida, and in 1514 entrusted with the command of an expedition fitting out at Seville against the Carribees. This however proving unsuccessful, Ponce retired to Puerto Rico, where he resided until 1521, when, being roused by the fame of the recent exploits of Cortés [Cortes], he again fitted out two ships, and, having embarked almost the whole of his property, put to sea. In this manner he came upon the western coast of Florida, where he made a descent; but the Indians sallying forth to defend their shores, several of his men were slain, and himself wounded by an arrow in the thigh, of which he died soon after, at Cuba, in 1521.

(Herrera, *Historia de las Indias*, dec. 4, lib. ix., cap. viii., ix.; Navarrete, *Coleccion de Viages y Descubrimientos*, &c., vol. iii.)

PONCE, PEDRO, a Spanish Benedictine monk, in the convent of Oña in Old Castile, was born about the year 1530. He is considered the inventor of the art of teaching the dumb to speak, which he carried to such perfection as to make us doubt whether Braidwood, L'Epée, Sicard, and others accomplished more than he did. [Deaf and Dumb, p. 326.] According to Ambrosio Morales (*Antiguedades de España*, Alcalá, 1575, fol. 38), Ponce had to instruct two brothers and one sister of the Constable of Castile, and a son of the Gran Justicia of Aragon, all of whom were born deaf and dumb. These pupils made such progress, that after some time they not only were able to write correctly, but also to answer any questions put to them. One of them, Don Pedro de Velasco, who lived to be only twenty years of age, spoke and wrote Latin as well as his mother tongue, and was at the time of his death making considerable progress in the Greek language. His own account of himself is thus recorded: 'When I was a child, I knew nothing; I began first to write down the things which my master showed me, and afterwards I wrote down all the Spanish words in a book which was made for that purpose. Afterwards, with God's assistance, I began to spell, and then to pronounce, with all the force I could, though much saliva came from me,' &c.

Mr. Southey says that 'another of Ponce's pupils became a Benedictine monk, and was able to make confession, and explain his creed by word of mouth.' These facts would appear almost incredible, were they not universally attested by the best Spanish writers of the time, as well as by our countryman Sir Kenelm Digby, who, in his 'Two Treatises concerning the Body and Soul of Man' (Paris, 1644, cap. 28, n. 8), says, 'This priest brought the young lord to speak as distinctly as any man whosoever; and I have often discoursed with him whiles I wayted upon the Prince of Wales in Spaine.' According to the same author (p. 254) and to Juan de Castañiza (*Vida de San Benito*), Ponce wrote a treatise in Spanish, in which he explained his method, and laid down certain rules as the result of his observations; but this interesting work has been lost, though it is generally believed that Juan Pablo Bonet, who in 1620 published his *Reduccion de las Letras, y Arte para enseñar á hablar los Mudos*, 1620, 4to., saw and consulted it. Ponce died in 1584, and was buried in the convent of his order.

POND, JOHN, was born about 1767, and was successively at Maidstone grammar-school, under the tuition of Wales, known as astronomer to Captain Cook's expedition, and at Trinity College, Cambridge. Having been obliged, from the ill health which attended him almost through life, to spend several years abroad, he settled himself, on his return, at Westbury near Bristol, where he resided till his marriage in 1807. He then settled in London; and in 1811 was appointed to succeed Dr. Maskelyne as astronomer royal. He retired from this office upon a pension in 1835, and died September 7, 1836, at Blackheath. He was buried at Lee near Blackheath, in the same tomb with his predecessor Halley. (*Monthly Notice of the Royal Astronomical Society*, for February, 1837.)

Mr. Pond's attention was directed to astronomy by Wales, to whom it is stated that, when a boy, he pointed out some apparent imperfection of the Greenwich instruments, as shown in their published results. He did not continue this study at Cambridge, and missed the opportunity of acquiring that depth of mathematical knowledge which is necessary for the comprehension of the highest branches of the theory of gravitation. The branch of astronomy to which he devoted his subsequent life was the determination of the places of the fixed stars; and in knowledge of the instruments and methods necessary to be used, and sagacity in detecting and avoiding error, the opinion of those who are best able to judge places him second to none of his day. As a mere handler of instruments, his friend Troughton, one of the best of critics in such a matter, used to say that 'Mr. Pond had, within his knowledge, no equal or rival except Captain Kater.'

The circumstance which brought Mr. Pond into notice as an astronomer was the following:—when at Westbury, he became possessed of an altitude and azimuth circle by Troughton, and undertook a series of observations, from which he deduced (*Phil. Trans.*, 1806) that the quadrant then still in use at Greenwich for the determination of declinations had changed its form since the time of Bradley: a result which Troughton verified by actual measurement of the instrument. A mural circle (called Troughton's, from its maker) was accordingly ordered, in place of the quadrant; but it was not erected till 1812, when Mr. Pond, who had pointed out (or at least who had proved, for it had been suspected before) the error of the old instrument, was settled in his place at Greenwich. This circumstance would peculiarly connect his name with the mural circle (which from that time began to be looked upon as one of the essentials of an observatory), if other circumstances did not do this so much more fully, that the accident of his being the first Greenwich astronomer who used the instrument becomes comparatively insignificant. The memoir above cited says, 'Mr. Pond saw, almost intuitively, the vast superiority of this over every other form of the declination instrument, and for some years he and the artist who constructed it were perhaps the only persons who did clearly see and broadly assert that the operation of a circle did not depend upon having a bearing on each side, or a complete axis.' In 1825 the mural circle made by Mr. Jones, and intended for the Cape of Good Hope, was sent to Greenwich for examination. During this process Mr. Pond first used the two instruments for direct and reflected observations of the same star, a method which is thought to have been suggested by Troughton; and, at his request, the circle intended for the Cape was retained at Greenwich.* Mr. Pond is also the inventor of the method of observing in groups, described in the article CIRCLE (p. 189); and it is also to be noted that he was the very first astronomer who advocated what is now the universal practice, of depending upon masses of observations for all fundamental data.

In 1833 Mr. Pond had finished his standard catalogue of 1113 stars, which was then the largest of those which had any pretension to the same degree of accuracy. The controversy between Pond and Brinkley on the parallax of the fixed stars is a matter of history, on which it only concerns us here to say that the general opinion now is, that the former was right in his assertion that the latter did not prove the existence of a sensible amount of parallax. [PARALLAX.]

The works of Mr. Pond are: 1, the volumes of Greenwich Observations, published during his astronomership; 2, various Papers in the Transactions of the Royal and the Royal Astronomical Societies; 3, a Translation of the 'Système du Monde' of Laplace. His astronomical writings are condensed, and not addressed to any but those who have a thorough acquaintance with the subject. There is nothing of a popular nature in the usual work of an observatory; so that while few except astronomers knew more of the subject of this article than that one John Pond, Esquire, was noted in the almanacs and directories as astronomer royal, the following is the testimony of the Astronomical Society:—'It is not too much to say that meridian sidereal observation (which excludes the Herschelian branch of astronomy) owes more to him than to all his countrymen put together since the time of Bradley.'

PONDICHERRY, a considerable town on the sea-coast of the Carnatic, in Hindustan, formerly the principal seat of the French power in the East Indies, in 11° 57′ N. lat., 79° 54′ E. long., 85 miles south by west of Madras.

The first commercial expedition of the French which succeeded in reaching the East Indies by sea was composed of two vessels fitted out from a port in Bretagne (A.D. 1601); but the vessels were wrecked on the Maldive Islands before reaching their ultimate destination, and their commander returned ten years afterwards to France. A company of merchants sent out some vessels from a port in Normandy to Java (A.D. 1616 and 1619), but the success of this attempt was not such as to afford much encouragement. The next expedition was from Dieppe (A.D. 1633), where some merchants fitted out vessels and made several voyages. A company, established A.D. 1642, formed some settlements in Madagascar, but these in a few years dwindled almost to nothing.

In A.D. 1664, Colbert presented to Louis XIV. the plan of an India Company, which received the royal sanction. The first attempt of the new Company was to continue the settlements of Madagascar; but this attempt having failed, they turned their attention to the establishment of factories in Hindustan, and fixed the principal one at Surat on the coast of Gujerat (130 or 140 miles north of Bombay), at that time one of the largest and most commercial cities of Hindustan. Finding however that the competition of nations of more commercial character, and whose credit in the East was more firmly established, placed them at a great disadvantage, the French adventurers left Surat, and, supported by a strong squadron sent out from Europe, attempted to form an independent settlement at Trincomalee on the north side of Ceylon (A.D. 1672). From this place they were very soon driven by the Dutch, and sailing to the coast of the Carnatic, they took by assault the Portuguese settlement of St. Thomé, or Meliapoor, not far from Madras, from which they were again expelled (A.D. 1674), and the wreck of this unfortunate expedition took refuge at Pondicherry, a little town on the same coast, which they had purchased two years before (A.D. 1672), of the king of Visiapoor or Bejapoor. [BEJAPOOR.]

In following years they attempted to establish themselves in Siam, but the attempt failed (A.D. 1684-88), and they directed their chief attention to Pondicherry, which they strengthened with considerable fortifications. It was taken by the Dutch (A.D. 1693), but restored at the peace of Ryswick (A.D. 1697) with the fortifications greatly improved. The town at this period owed much to the wisdom and probity of M. Martin, its founder and subsequent governor. In the mean time the affairs of the India Company, by which the establishment had been formed, were going to ruin, through the mismanagement of those who directed it, the financial measures of the government, and the wars which were carried on near the close of the seventeenth and the beginning of the eighteenth centuries. In 1719 it was united with several other trading companies into one body, to which the government, influenced by the financial views of Law [LAW, JOHN], granted many privileges; but its affairs were conducted with little wisdom, except with regard to Pondicherry, the defences of which were further augmented. Dumas, who was sent out as governor, obtained from the court of Delhi the permission to coin money and the cession of the territory of Karical in the district of Tanjore.

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* Here it remained until it was lately sent to its original destination. The direct and reflected observations are now made with one circle only.

During the government of Dumas, the nabob of Arcot was defeated and slain by the Mahrattas; and many of his family and subjects took refuge at Pondicherry, which was in consequence threatened by the victors; but the firmness of Dumas induced the Mahratta general to give up the enterprise and make a treaty with the French. About this time the French colony in Mauritius, or the Isle of France [MAURITIUS], was rising into importance under the care of La Bourdonnais; Bourbon had been colonised some time before [BOURBON]: both belonged to the India Company. The settlement of Chandernagore in Bengal, on the river Hoogly, 16 miles above Calcutta, was at the same time rising into importance under the management of Dupleix, who extended the commercial relations of the settlement in all directions. In 1742 Dupleix was removed to Pondicherry, and made director-general of the affairs of the Company in the East, which were at that time in their most prosperous condition.

In 1746 a French squadron, fitted out at the Isle of France by the activity of La Bourdonnais, arrived on the coast of the Carnatic, and having landed a considerable force, obliged Madras to surrender. But discord between Dupleix and La Bourdonnais injured the French interests, and the latter left the coast. Dupleix retained Madras, which La Bourdonnais had agreed to restore, and attempted, but without success, to capture Fort St. David, another English settlement. In 1748 Pondicherry was attacked by the English with a considerable fleet and army under Admiral Boscawen and Major Lawrence; but the siege was raised after several days, and the English retreated.

In 1749 Dupleix engaged in an attempt to raise two claimants, Mirzapha Jung and Chunda Saheb, to the offices of subahdar or viceroy of Deccan and of nabob of the Carnatic, by dispossessing the then occupants. The nabob of the Carnatic, An'-war-ad-dien, was defeated and slain, A.D. 1749, and the subahdar, though supported by the English, was killed by some traitors in his own army, with the encouragement of the French (A.D. 1750), and was succeeded by the claimant supported by Dupleix. Dupleix was appointed by the new subahdar governor of all the Mogul dominions on the coast of the Carnatic south of the river Kistna, in return for the aid he had given to his elevation. The claimant of the nabobship of the Carnatic was established as deputy of Dupleix at Arcot. An attack on Mahomed Ali, rajah of Trichinopoly, son of An'-war-ad-dien, was defeated by the intervention of the English, who sought to establish Mahomed as nabob of the Carnatic. The French resisted, and obtained support among the native powers, and severe but indecisive hostilities continued for some time. Negotiations were then tried, during which Dupleix was superseded, and a treaty was concluded which left Mahomed Ali nabob of the Carnatic (A.D. 1754). About this time the French had obtained of the subahdar of Deccan (Salabut Jung, brother and successor of Mirzapha Jung) the cession of an extensive line of coast in the Northern Circars; these by the treaty were to be given up, but the French appear to have retained them until, in the following war, they were expelled by the English.

In 1757 the war in the Carnatic was renewed: in 1758 the Count de Lally arrived at Pondicherry with strong reinforcements from France, and immediately attacked Fort St. David, about 16 miles south of that town, which he took by capitulation, and forced the English to abandon Devicottah, another of their posts. He next attacked the king of Tanjore, but unsuccessfully. Arcot and the black town of Madras were indeed taken, but Fort St. George (the fort of Madras) was relieved by an English fleet (1759), and Lally, with an exhausted commissariat and an empty paychest, retreated to Pondicherry. Subsequent hostilities were entirely to the disadvantage of the French; they were defeated at Wandewash, Arcot was retaken (A.D. 1760), and the English laid siege to Pondicherry, which surrendered early next year, and was subsequently demolished. The one or two posts which the French retained in the Carnatic followed its example; and Lally returned to Europe to perish by an iniquitous sentence on the scaffold.

At the peace of 1763 the French possessions in the Carnatic were restored. The management of the India Company, whose affairs were at a very low ebb, underwent considerable alterations. Some of their trading privileges were abolished, though in a few cases compensation was granted in the shape of an annual payment from the government or the parties benefited by the abolition. Subsequent changes (A.D. 1769) nearly annihilated the Company; its remaining privileges of exclusive trading were suspended; its vessels, the port of Lorient [LORIENT], and its Indian possessions, were given up to the government; which undertook, in return, the payment of most of the demands on the Company, and the creation of some perpetual annuities to meet the claims of the proprietors of the Company's stock.

In 1765 the rebuilding of Pondicherry was commenced, and in 1770 the population amounted to 27,000, almost entirely natives. But the superiority of the English in Hindustan was now decided. On the breaking out of hostilities between England and France in 1778, Pondicherry was taken by Sir Hector Monro after a gallant defence. The other French possessions were also seized; but some French officers and soldiers engaged in the service of Hyder Ali, and thus continued to oppose the power of England. In 1782 considerable armaments both from France and England arrived in India, and a body of 2000 French joined the troops of Hyder Ali. Several indecisive actions were fought by the hostile fleets under Suffrein and Hughes, and Trincomalee in Ceylon, which the English had just captured from the Dutch, was taken by the French; but Pondicherry and their other territorial possessions in India were not recovered till the peace of 1783. In 1793 they were again conquered by the English; restored by the peace of Amiens; again conquered in 1803; and again restored in 1814. The possessions of France in the East Indies now comprehend Pondicherry and Karical, with their dependencies on the Coromandel (or Carnatic) coast; Yanaon and its dependencies, with the factory of Masulipatam in the Northern Circars; Chandernagore and its territory, with Goretti and some other factories, in Bengal; and Mahé, and factories at Calicut and Surat on the western coast. They have also factories at Muscat and Mocha in Arabia. The island of Bourbon still belongs to the French: but Mauritius, or the Isle of France, has passed into the hands of the English. (*Malte Brun.*)

Pondicherry is built in a sandy plain not far from the shore, and consists of two parts, the white town and the black town. The white town is handsome; the streets are built with remarkable regularity, intersecting each other at right angles, and are of a uniform width. The houses are tolerably high, and have flat roofs; they are covered with stucco, white or yellow, and are adorned with fore courts or gardens. In the centre of the city is a spacious square planted with trees and laid out in walks, and open on the east side to the sea. The black town lies to the south of the white town, from which it is separated by a ditch or canal, with trees planted along the bank: it is laid out almost as regularly as the European quarter, but the houses are for the most part mere huts. Of the fortifications nothing remains but a brick tower, where the flag is hoisted. The French are debarred by treaty from restoring the fortifications, or from maintaining any force beyond what is necessary for the purposes of police. There are a government-house on one side of the square, a handsome building; a new bazaar, and at least two churches, one of them formerly belonging to the Jesuits' college, and the other to the Capuchin convent; the college buildings have been converted into a residence for the Catholic bishop and his clergy; the convent was destroyed by the English on the capture of Pondicherry in 1761. There is a grand pagoda in the black town, a building of vast size and grotesque architecture.

The population of the town and suburbs is computed to be 40,000. Trade is dull; the fiscal regulations of the British prevent the carrying on of any traffic with the interior. there is no harbour, but a tolerable roadstead. Indigo, sugar-cane, millet, dye and aromatic woods, and mulberry-trees are cultivated in the neighbourhood. The exports consist of rice, drugs, sugar, indigo, and blue linens. The imports are lace, and articles of dress, furniture, jewellery, and books. There are two courts of justice, a mint, a college, schools for whites and for blacks, a botanic garden, a mont de piété, or office for small loans, and several charitable institutions.

PONGO, an African word supposed to be corrupted from *Boggo*, and said to be applied indifferently to the *Chimpanzee*, the *Mandrill*, and the baboons of that country. Buffon appears to have been the first who used it to designate a gigantic species of *Orang-Utan*. Audebert restricts the appellation to the *Chimpanzee*. Wurmb first definitely applied the term to the *Pithecus Wurmbii*. Cuvier, together with most modern zoologists, follows Wurmb in this application. Mr. Swainson (*Classification of Quadrupeds*), speaking of *Pithecus*, says, 'This is the remarkable animal called *Pongo* by M. Wurmb; an ape, about whose natural station great diversity of opinion exists. M. Cuvier places it with the Oran-Outang; and expresses an opinion that the latter is merely the young. Illiger, on the contrary, considers it so closely allied to the baboons, that he calls it a *Cynocephalus*. From these opinions we may draw the inference that it is intimately connected with both, while subsequent information has incontestibly proved it is distinct from either. It is, in short, an ape with the aspect of a baboon.' We are of the same opinion with Professor Owen and others who take *Pongo* as the name or sign of the adult orang of the larger species, *Pithecus Wurmbii*.

PONIATOWSKI, STANISLAUS, COUNT, a Polish nobleman, born in 1678, who took the part of Stanislaus Leckzinski and of his protector Charles XII. of Sweden, against King Augustus and the Russian party, as it was called, in Poland. [Augustus II. of Poland; Charles XII. of Sweden.] He followed Charles in his adventurous expedition into Russia, with the rank of major-general in the Swedish army, and after the defeat of Pultawa materially helped the king to effect his escape with a handful of men into the Turkish territory. Having seen his master safely lodged at Bender, Poniatowski repaired to Constantinople as his agent, to forward his interests with the Sultan. He displayed in that difficult and dangerous mission all the resources of a most experienced diplomatist. Alone, without connections, the representative of a fugitive king, who was himself a kind of prisoner in the hands of the Turks, he contrived to engage the Porte to espouse the cause of Charles and to attack Russia, and he obtained influence enough to obtain the dismissal of several viziers in succession, for having thwarted his views.

The curious particulars of his negotiations at the Porte are related in a lively manner by Voltaire, in his 'History of Charles XII.' At last, when Charles resolved to quit Bender, Poniatowski followed his master into Germany, where he remained with Stanislaus Leckzinski, the protégé of Charles, who had been driven out of Poland by the Russian party. Poniatowski remained with Stanislaus till the death of Charles, when all hopes of seeing him restored to the crown of Poland having vanished, Poniatowski made his submission to King Augustus, who not only restored to him his property, but made him treasurer of Lithuania, general of the guards, and lastly, palatine of Masovia. After the death of Augustus he endeavoured to effect the restoration of Stanislaus Leckzinski, but did not succeed, and the elector of Saxony was elected king. [Augustus III.]

Poniatowski made his submission to the new king, who took him into favour, and made him, in 1752, castellan of Cracow, which was one of the highest dignities in the kingdom. Some time after he retired to his estates, where he died in 1762. He married a Princess Czartoriska, by whom he had two sons, one of whom became afterwards king of Poland [Stanislaus Augustus], and the other entered the Austrian service and became lieutenant-general of artillery.

PONIATOWSKI, JOSEPH, PRINCE, born at Warsaw, in 1763, was the son of Andreas Poniatowski, lieutenant-general of artillery in the Austrian service, and nephew to Stanislaus Augustus, the last king of Poland. He entered the Austrian service, and became colonel of dragoons and aide-de-camp of the emperor Joseph II., with whom he made a campaign against the Turks in 1787. In 1789 he returned to Poland, where he showed himself a warm supporter of the independence of his country. He fought against the Russians in 1792, but was obliged to resign his command in consequence of the king's weakness and partiality for Russia. In 1794, when the Poles again rose against the Russians, Joseph Poniatowski served under Kosciusko, but Kosciusko being defeated, he was obliged to emigrate, and he retired to Vienna.

In 1798 he returned to Warsaw, which was then under the dominion of Prussia, and the Prussian government restored to him part of his estates, where he spent several years. After the battle of Jena, in 1806, and the invasion of Prussia by Napoleon, the French armies advanced towards the Vistula. In this crisis he was appointed by the king of Prussia military commander of Warsaw, where he formed a national guard for the security of the city. In this capacity he received the French general Murat, who took possession of Warsaw, in November, 1806. At first he would not accept any service under the French, until Napoleon, having arrived at Warsaw, cajoled the Poles with fine though vague promises, talking, in his own oracular style, of 'the destinies of Poland being on the eve of being fulfilled,' &c. The Poles trusted to him, and a national army was formed, of which Poniatowski took the command, and which rendered great services to the French during the campaign of 1807 against the Russians. By the peace of Tilsit, Russia and Austria retained the greater part of Poland, and the duchy of Warsaw was given to the king of Saxony. Poniatowski remained minister at war for the duchy, but the Polish army was scattered among the French garrisons in Germany, and some regiments were drafted for service in Spain. When a new war broke out between Austria and Napoleon in 1809, Poniatowski, who had only a small force left with him, after fighting against the Austrians, was obliged to evacuate Warsaw, but he soon after invaded Galicia, and called the inhabitants to arms.

By the peace of Vienna (October, 1809), Galicia was taken away from Austria and united to the grand-duchy of Warsaw. When the war broke out between France and Russia in 1812, Poniatowski, who had in the mean time increased and disciplined the Polish army, obtained the command of the fifth corps of the 'grand army,' which was composed entirely of Poles. He fought bravely in several battles against the Russians, and entered Moscow with Napoleon. At the same time he maintained the strictest discipline in his corps, which did not share in the excesses committed by other portions of the invading army. In the disastrous retreat from Moscow the same corps distinguished itself by its orderly behaviour. Being obliged to evacuate Warsaw, Poniatowski withdrew into Saxony, and in the following campaign of 1813 Napoleon gave him the command of a mixed corps of French and Poles. He fought with his usual bravery in various battles, and was made a marshal of France by Napoleon just before the battle of Leipzig. A few days after, on the 18th of October, while protecting with a handful of men the retreat of the French, he was twice wounded, and being pressed by the enemy upon the banks of the river Elster, which was swelled by the rains, he spurred his horse into the river and disappeared in the water.

Joseph Poniatowski was not only an able and brave officer, but he was also a man of strict and upright principles, and his integrity was well known. Less confiding than most of his countrymen in the promises of Napoleon, he followed, from a sense of duty to his country, what he conceived to be the only chance left of regaining its independence. Joseph Poniatowski left no children.

PONS. [Charente Inferieure.]

PONS VAROLII. [Brain.]

PONT-A-MOUSSON. [Lavoro, Terra di.]

PONTE. [Bassano.]

PONTEFRACT, an antient borough, a market-town, township, and parish in the upper division of the wapentake of Osgoldcross, in the honour or liberty of Pontefract, and in the West Riding of Yorkshire. By the Reform Act the borough includes Ferrybridge, the castle precincts, Pontefract Park, and the townships of Tanshelf, Monkhill, Knottingley, and Carlton. These places, with the exception of Pontefract Park, which is extra-parochial, form the parish of Pontefract, contain nearly 10,000 inhabitants and send two members to parliament. The parish extends over 7790 acres. Pontefract Park comprises 1300 acres. The municipal borough is still confined to the township of Pontefract, and has four aldermen and twelve councillors. The honour of Pontefract belongs to the crown, as part of the Duchy of Lancaster; it has local courts, and a debtors' gaol. The Court Baron for the recovery of debts under five pounds is held at Pontefract once in three weeks, and by adjournment from thence, at Huddersfield, Bradford, Leeds, and Barnsley. The debtors' gaol is at Rothwell. Pontefract is 173 miles north-north-west of London, and twenty-four miles south-south-west of York.

This town is of great antiquity, and of considerable historical importance. Its origin and the etymology of its name are alike unknown. The legends of antient historians and the conjectures of those of later date are equally unworthy of notice. According to Camden its name was changed to Pontefract by the Romans. The place was called Kirkby in the time of the Saxons, and it is not improbable that it was one of the first places in England at which a church was erected and Christianity preached.

After the Conquest, Ilbert de Lacy received a grant of the place; in the tenth year of William, his vast possessions were confirmed to him. Soon after he began to build his castle, which partook of the features of castle, fortress, and palace. He is said to have called the name of the town *Pontfrete*, from some fancied resemblance to a place so called in Normandy, where he was born. The castle was built on an elevated rock, and it had a most extensive and picturesque view of the surrounding country. It was not commanded by any contiguous hill, and could only be taken by blockade. The wall of the castle yard was high, and flanked by seven towers. A deep moat was cut on the western side, where were also the barbican and drawbridge; there were other gates, which might be used as watch-towers, and some of them were protected by drawbridges. The dungeons were of a frightful nature. The area covered and enclosed by this immense building was about seven acres. [BRADFORD.]

Ilbert de Lacy was a great favourite with William, and received from him as a reward for his adherence and services one hundred and fifty manors in the west of Yorkshire, ten in Nottinghamshire, and four in Lincolnshire. These vast possessions were confirmed to his son Robert, called Robert de Pontefract, by William Rufus; they descended from him to his son Ilbert, and continued in the family till 1310, when Henry de Lacy, having no male children, left his estates to his daughter Alice, who was married to Thomas, earl of Lancaster, uncle to Edward II. In the quarrels between that weak-minded prince and his nobles, the Earl of Lancaster acted a very conspicuous part. He was taken prisoner with many other barons, and brought to Pontefract Castle, which had fallen into the hands of the royal army. Here he was imprisoned for some time, tried by his peers, some of whom were his mortal enemies, was convicted without being heard in his own defence, suffered many indignities, and was afterwards hurried away to execution. He obtained the favour of dying on the block, whilst the barons who were his adherents were hanged. Pontefract Castle was afterwards the scene of Richard II.'s imprisonment and death; but whether he was murdered or starved to death has not hitherto been satisfactorily decided. Here the Duke of Gloucester, afterwards Richard III., shed the blood, without any legal trial, of Anthony Woodville, Earl Rivers, Richard lord Grey, Sir Thomas Vaughan, and Sir Richard Hawse, in order to make more easy his accession to the throne. In the reign of Henry VIII. the fortress surrendered to the famous Robert Aske, captain-general of the Pilgrims of Graco; and during the civil wars between Charles I. and the parliamentarians the castle was frequently besieged and defended by both parties. The garrison, after having been reduced from 600 men to 100, surrendered, in 1649, to General Lambert, having first proclaimed Charles II. successor to the throne of his father, and done all to defend it that a garrison of brave men could do. Shortly after it was dismantled by order of parliament, and all the valuable materials were sold.' For 600 years the castle of Pontefract was the ornament and terror of the surrounding country; at the present day little even of its ruins remain. The area is now chiefly occupied by gardens, and a quarry of filtering-stones, which are in great request in all parts of the kingdom.

The parish church of Pontefract, dedicated to St. Giles, is small, and has no great pretensions to notice. The more antient church of All Saints, the original parish church, is in the form of a cross, with a handsome tower in the middle: it is mentioned by Rickman as deserving of attentive examination. This church probably dates as far back as the time of Henry III.; it is altogether in the style of that period The other places of worship are the Roman Catholic chapel, the Friends' meeting-house, and the Independent, Wesleyan, and Primitive Methodists' chapels.

The town has a subscription library, a mechanics' library, and a news-room. The free grammar-school was established in the reign of Edward VI.; it fell into neglect, and was complained of to the chancellor of the duchy in the 6th Elizabeth, and again about a century afterwards. It was re-chartered in 1792, by George III., and placed under the visitorial control of the chancellor of the duchy of Lancaster. It is one of the twelve schools that send candidates for Lady Elizabeth Hastings's exhibitions at Queen's College, Oxford. The master is allowed to take boarders.

The other charity-school of Pontefract is now merged in the national school; it has an endowment of 85*l.* a year, and receives ten guineas a year from the charity of Lady E. Hastings. This income is again augmented by annual subscriptions. 'When the king's grammar-school was re-founded in the reign of George III., the trustees of this charity (the charity-school) appropriated 150*l.* from its funds towards the erection of the said grammar-school.' (Boothroyd's *Pontefract.*) The British school, which is supported by small payments from the children, and subscriptions, was commenced in 1831, and re-established in 1837; the theatre having been purchased and divided into two rooms capable of accommodating 400 pupils of both sexes. The town-hall is a handsome building, which was erected on the site of the old moot-hall, at the joint expense of the county and the corporation; the borough and petty sessions are held in it. The spring quarter-sessions are held in the court-house during the Easter week, a commodious modern building, which was built at the expense of the West Riding. The gas-works were constructed in 1832, at an expense of 4200*l.* The races, formerly held yearly in September, are extinct; the course occupies a portion of the park district. There are at Pontefract a number of endowed alms-houses or hospitals, which mostly bear the name of their founders; they afford the usual benefits, and are open to the common objections made to such charities. The market is held on the Saturday, and is well supplied, and there are eight annual fairs for the sale of cattle. The general aspect of the town is neat, airy, and spacious; it is chiefly celebrated for its extensive gardens, nurseries, and liquorice-grounds; its soil is rich and deep. Great quantities of vegetables are supplied by Pontefract to Leeds, Wakefield, and other populous towns in the county. (*Communication from Yorkshire.*)

PO'NTIFEX was the name by which the Romans designated the members of the most illustrious of their great colleges of priests. The pontiffs are said to have been instituted by Numa Pompilius for the purpose of taking care that the laws relating to religion should be observed by individuals as well as by the state. Their original number, according to Livy (x. 6), was four, two for each of the tribes of the Ramnes and Tities. Cicero (*De Rep.*, ii. 14) says that their number was five, but he includes the Pontifex Maximus, or chief pontiff.

The minor pontiffs were a college of priests of which scarcely anything is known: Cicero mentions three members of it (*Harusp. Resp.*, 6), and Niebuhr (*Hist. of Rome*, i. note, 775) supposes that it belonged to the Luceres, who had no representative in the great college of pontiffs. The name of the minor pontiffs was afterwards transferred to the secretaries of the other pontiffs (pontifices majores: Liv., xxii. 57; Capitolin., *Vit. Macrin.*, 7).

When the great state-offices had become accessible to the plebeians, they also obtained the privilege of being represented in the college of pontiffs by members of their own order. This change was brought about in 300 B.C. by the Ogulnian law, by which the original number of pontiffs, through the addition of four plebeians, was increased to eight, or, including the chief pontiff, to nine. (Liv., x. 6, 9.) The chief pontiff however continued to be taken from the patricians to the year 254 B.C. (Liv., *Epit.*, xviii.) This number remained the same for more than two centuries, until in 81 B.C. the dictator Sulla raised it to fifteen. (Liv., *Epit.*, 89.) J. Cæsar added one more pontiff. (Dion Cass., xlii., p. 236.) In the early ages of the history of Rome the pontiffs were elected by the kings, but after the overthrow of the kingly power the college exercised the right of co-optation (Dionys. Hal., ii. 73; Livy, xl. 42), until 104 B.C., when the right of electing persons to the office of pontiff was partly transferred to the people by the Domitian law; for, according to this law the co-optation of the college was still necessary as a religious ceremony, after a person had been elected by the people. (Cic., *in Rull.*, ii. 7.) When Sulla increased the number of pontiffs, he at the same time gave back to the college the full right of co-optation; the tribune Labienus indeed, in 63 B.C., revived the Domitian law, but it was again abolished by Antony. (Dion Cass., xliv., p. 305.) The chief pontiff, who at first seems to have been appointed by the kings, was afterwards elected by the curies in the comitia curiata, and generally taken from the number of the pontiffs themselves, or from those who had held the highest offices of the state. (Liv., xl. 42, comp. with xxv. 5.) The functions of the college of pontiffs were not limited to the service of any particular deity. It had very extensive powers, and not only had the superintendence over all matters of religion, but even those which were in any degree connected with it, such as marriage, adoption by adrogation (Cic., *Pro Dom.*, 13), and funeral ceremonies. They had a direct judicial power, and might in some instances even punish with death. (Cic., *De Legg.*, ii. 9; comp. with Liv., xxii. 57.) The chief pontiff, whose office, like that of the other pontiffs, was for life, and who was not responsible either to the senate or the people, was supreme judge in all matters relating to or connected with religion, and from his sentence an appeal could only be made to the people in cases where a magistrate was fined or his person seized (Liv., xl. 42); for the few instances of later times where a tribune interposed and modified the sentence of the chief pontiff seem to have been anomalies. His powers extended over magistrates as well as private individuals; and the former, if acting contrary to the laws of religion, might be fined (Liv., xxvii. 51; Cic., *Philip.*, xi. 8; Liv., xl. 42), or compelled by the chief pontiff to resign their office. It also formed part of his duties to regulate the calendar, and to interpret the ceremonial laws, for he and his college were in the exclusive possession of the ritual books (commentarii sacrorum or libri pontificales), in which all religious rites were laid down, and which at all times were considered as decisive upon any point which belonged to their jurisdiction. The rules and regulations which guided the pontifices formed a large body of law, called 'Jus Pontificium.' (Cic., *De Or.*, i. 43; iii. 33; *Pro Dom.*, 13.) The oath tendered to a newly elected pontiff, not to profane the sacred rites by any untimely publication, most probably referred to these books. (Dionys. Hal,. ii. 133.) The chief pontiff had moreover to keep a kind of state archive (the commentarii pontificum, annales pontificum, or annales maximi), in which he recorded the memorable events of every year, and which were exhibited at his house for the inspection of the people. The assemblies of the curies could only be held when the pontiff had no religious grounds for preventing them, and their presence was indispensable at these meetings. (Gellius, v. 19; Dionys. Hal., ix. 41, comp. with x. 32.) Among the external distinctions of the pontiffs, were the toga prætexta, and the tutulus or galerus, a cap of a conic form adorned with an apex. They lived in public buildings on the Via Sacra (Suet., *Cæs.*, 46), or in the house of Numa (Plin., *Epist.*, iv. 11). The chief pontiff was not permitted to quit Italy (a rule first violated by P. Licinius Crassus); he was not allowed either to see or to touch a corpse, or even to visit a house in which there was a dead body. After the death of his wife, who, according to the laws, should always be a woman of great moral virtue, he was not permitted to marry again. (Plin., *Paneg.*, 83.) He also elected the vestal virgins, and superintended their moral conduct. From the time that Augustus assumed the office of chief pontiff, it was held by all his successors down to the time of Gratianus, who disdained this dignity. (Zosim., iv. 36, 9.) The title P.M., or PON. M., Pontifex Maximus, appears on some of the coins of the Roman emperors. [CALIGULA.] The mode of living of the Roman pontiffs does not seem to have been much more sober or simple than that of some priests of modern times. (Horat., *Od.*, ii. 14, 26, ff.; Martial, *Epigr.*, xii. 48, 12; Macrob., *Sat.*, ii. 9.)

PONTIUS PILATE. [PILATE, PONTIUS.]

PONTIVY. [MORBIHAN.]

PONTOISE. [SEINE ET OISE.]

PONTOON, or PONTON. This term is employed by the French to signify any barge or flat-bottomed boat; but in this country it is confined to those vessels which are used in the formation of floating-bridges for military purposes.

The conveyance of an army with its artillery and baggage across the rivers which intersect its line of march is one of the most difficult as well as the most important operations in military tactics. The occupation of an advantageous position in a given time, when the army acts offensively, materially influences the success of a campaign; and the favourable moment may be lost, if means should not be at hand to overcome the obstacle presented by a deep and rapid stream. But the failure or insufficiency of such means must be attended with the most fatal consequences to a retreating army, when it is prevented by a river from getting beyond the reach of an enemy; for its safety, in this case, depends upon the power of passing the river without delay, and upon the removal or destruction of the bridge immediately afterwards.

History presents us with innumerable instances, both of the ruin of armies caused by the want of means to make good their passage across rivers, and of the protection which armies have received when rivers have interposed between them and the superior forces of an enemy. To take an example from modern warfare, it may be observed, that during the retreat of Napoleon from Moscow, had it not been for the extraordinary care used by the chief of the French engineers to preserve the materials requisite for the formation of a bridge, the whole of the army must have been captured or destroyed on the banks of the Beresina.

The rapidity of warlike operations seldom allows bridges, at least those of considerable magnitude, to be constructed on piles or piers; and perhaps the only military work of this nature which need be hinted at is that which was formed by Cæsar across the Rhine. [BRIDGE.]

Bridges consisting of timber platforms supported on floating vessels appear to have been in use in all ages. But those which were thrown by Darius across the Bosporus, and subsequently over the Danube, and that which was formed by the order of Xerxes over the Hellespont at the time of his unfortunate expedition into Europe, deserve to be considered as the most famous works of that nature which were constructed by the antients: and Herodotus, who has preserved (lib. iv., 88) the name of the Greek engineer employed on the two first, has also given a full description of the last (vii. 36). He states that 360 vessels, anchored both at the head and stern, were disposed in parallel directions across the strait with their keels in the direction of the current, in order to diminish the strain on their cables; and that parallel to this line, but nearer the Archipelago, was another consisting of 314 vessels, similarly disposed. The vessels were connected together by cables, over which was laid a platform of planks covered with a bed of earth, and there was a rail on each side. Xenophon also relates (*Anabasis*, lib. ii., c. 4) that the Greeks, in their retreat, passed the Tigris by means of a bridge which was supported on thirty-seven vessels. Of such boat-bridges for military purposes the most remarkable, in modern times, is that which was formed, by the engineers of the British army, across the Adour, in the south of France, in 1814. It consisted of 25 chasse-marées, varying in burthen from 20 to 40 tons, which were moored at distances of nearly 40 feet from centre to centre. At first, hawsers resting on their decks were strained by capstans and made fast to some heavy guns which were laid behind the retaining walls on the sides of the river, and these ropes carried the planks which formed the roadway; but after a few weeks they were removed, and replaced by timbers, which from their steadiness were found preferable. The breadth of the river at the place where the bridge was formed is 810 feet, and booms were moored across, both above and below the bridge, for its protection.

The precise period at which pontoons, or flat-bottomed vessels, were first employed to support a bridge is unknown. Folard observes, in his observations on the fifth book of Polybius, that for passing rivers the Germans in his time used vessels formed of timber frames covered with leather: he adds that the Dutch troops had pontoons of wood covered with tin, and that the French took some of them at the battle of Fleurus, which was gained, in 1698, by the Maréchal de Luxembourg over the Prince of Waldeck. Mention is frequently made of pontoon-bridges, both in Germany and Italy in the beginning of the eighteenth century, particularly during the campaigns of Marlborough; and, from the speed with which they are said to have been executed when required, it is probable that a corps of men was then particularly employed in that branch of service.

The pontoons employed during the late war differed but little from those used in the times above alluded to: they were from 17 to 21 feet long; from 4 to 5 feet broad, and from 2 feet to 2 feet 3 inches deep. In the formation of the bridge, a rope was tightly stretched across the river; the vessels were then rowed to their places, and each was made fast at one end to the rope; another rope was then stretched across the river, parallel to the former, at the opposite ends of the pontoons, and to this rope those ends were made fast. When a strong current set obliquely across the river, the sides of every two pontoons were sometimes connected together by rope braces stretched diagonally across the intervals, in order that the effect of the current upon each might be counteracted by a like effect on the next; and, in very rapid streams, anchors were also thrown out from each or from every second or third pontoon according to circumstances.

Timber-baulks, or joists, were then laid from the shore to the first pontoon, from that to the next, and so on, at intervals from each other depending upon the breadth of the bridge or the weight to be supported. Every two in the direction of the length were attached together by a bolt, which allowed the bridge to yield to the rise or fall of the water. Above these timbers were placed the chesses, or flooring-planks, close together and perpendicular to the length of the bridge; and these were kept down by a riband or a plank, which was fastened over their extremities on each side of the bridge.

Colonel Pasley, to whom the department of military engineering in the British service is so much indebted for the improvements which he has introduced into every branch of art connected with practical fortification and siege operations, has for many years devoted particular attention to the subject of military bridges. The form of the old pontoons rendering them difficult to manage in the water, and their great weight, when it was necessary to transport them from place to place by land, causing them to be a serious encumbrance to an army on its march, that officer was led to construct the pontoons in the form of canoes, with decks, each end being shaped like the head of a boat, in order that they might be easily moved through the water by rowing, with either end foremost. They are constructed of light timber frames, covered, except the deck, with sheet copper; and each vessel is formed in two equal parts by transverse partitions, so that the demi-pontoons may be separated from each other when the bridge is to be conveyed on carriages by land with the army. When in the water, the parts are connected together by a rope, which passes through two perforations in the keel, near the place of junction, and by a rectangular frame of wood, which is laid along the deck, and attached to it by lashings. Each half-vessel is also divided into two compartments by a partition; and small pumps are provided, by which the pontoon may for a time be kept afloat, should a hole be made in its side by a shot or by any other accident.

Sir James Colleton, some years since, invented pontoons of wood of a cylindrical form, some of which have been occasionally employed in experimental operations; and cylindrical pontoons of tin, which were subsequently invented by Major (now Colonel) Blanchard, have lately been introduced into the service. These last have hemispherical ends, and are divided both longitudinally and transversely into several compartments by partitions of tin, both to increase their strength and to prevent them from sinking in the water in the event of their being accidentally perforated in any part. They possess the advantages of great lightness and buoyancy; but they have not the durability of copper vessels, and they must be very liable to be injured when transported by land, particularly if a march should take place under a hot sun. Some of Colonel Pasley's copper pontoons are said to have been in use above 18 years.

In 1836 the comparative merits of Colonel Pasley's and Colonel Blanchard's pontoons were tried upon the Medway, when large bodies of infantry and cavalry, besides three pieces of artillery, were made to pass over the river on bridges supported by vessels of the two kinds. The order of march was purposely such as to subject the bridges to the severest strains; and a superiority of steadiness on this occasion appears to have led to a preference in favour of the pontoons proposed by the last-mentioned officer.

The breadth and depth of one of Col. Pasley's pontoons are 2ft. 8in. The diameter of one of Col. Blanchard's cylinders is 2ft. 6in. The length of each kind of pontoons is 22 feet.

The manner of forming the bridge, with both kinds, is nearly the same. A rectangular frame, whose length is about equal to the breadth of the platform for the intended bridge (12 feet), is laid down longitudinally on the deck of the canoe, or on the surface of the cylinder, and is kept in its place by rope lashings; on the upper surface of this frame, in the direction of its breadth, are nailed pieces of wood in pairs, at equal intervals; the distance between every two in each pair being little more than equal to the breadth of a baulk, or joist (2½ inches), one extremity of which is to be received between them, and the number of pairs being equal to the number of baulks which are to support the chesses or planks forming the roadway. A raft is formed with two of these pontoons, by placing them parallel to each other, at a distance, from centre to centre, equal to about 12½ feet; the ends of two baulks, or transoms, as they are called, are made to rest upon the frames before mentioned, the distance between them being equal to the intended breadth of the bridge, and they are kept steady by having near each extremity a hole bored through them, into which enters an iron pin fixed vertically for the purpose in the frame: they are also made fast to the pontoons by ropes passing through rings on the decks. Three or more baulks are then laid down parallel to the transoms, with their extremities confined between the cross-pieces nailed to the frames as abovesaid: the chesses are laid close together above them, and their ends are kept down by ribands, which are attached to the transoms by lashings passing over them, and under the latter, at intervals. In those ribands are fixed rowlock pins, and, when the bridge is not formed, the ribands being then placed parallel to the lengths of the pontoons, at the sides of the raft, the latter may be moved on the water by the oars.

When the bridge is to be formed, a certain number of such rafts are rowed to their stations in a line across the river, the lengths of the pontoons being parallel to the banks, and there anchored; the distances between the nearest pontoons in two rafts being equal to that between the two pontoons in each raft. Then each raft carrying the materials which are to make a platform over the water between itself and the next, such platform is laid down in a manner similar to that which is employed in laying down the platform of the raft; and from each of the extreme pontoons a like platform is extended to the shore of the river.

When the banks are favourable, the complement of men attached to each raft of two pontoons, namely 1 non-commissioned officer and 6 privates, can dismount two vessels and their stores from the carriages, launch them, and form the raft in a quarter of an hour. All the rafts being put together at the same time, the whole bridge may be formed in another quarter of an hour. After the passage has been effected, the bridge can be dismantled in eight minutes, the rafts can then be taken to pieces, and the vessels and stores re-packed on the carriages in a quarter of an hour.

In order to convey the pontoons with an army, each is placed, with all its accompaniments, on a four-wheeled carriage. Col. Pasley however is enabled to use only a cart with two wheels for each pontoon; the latter being separated into two demi-pontoons, which are placed side by side above their stores. The shortness of these carriages enables them to be turned within a smaller space than would be required for a four-wheeled waggon.

The inconvenience attending the transport of pontoons, or the necessity of passing a river when they are not at hand, has induced commanders of armies to have recourse to bridges supported on rafts of timber or on empty casks, which in Europe can always be procured. Each raft may consist of four or more rough trunks of trees lashed together, and may be retained in its place by anchors, or by being made fast to a rope stretched across the river: the baulks and chesses are applied as in a pontoon bridge. Perhaps the greatest raft-bridge ever formed is that which was executed by General Sokolniki over the Niemen at Grodno, in 1792. Trunks of trees from fifty to sixty feet long, and from twenty to twenty-eight inches in diameter, were united by tens, and every ten were bound together at both ends by transverse braces, so as to form a raft, which, as all the large ends of the trees were placed contiguously, resembled the voussoir of a bridge. All the voussoirs, fifty-seven in number, were placed in the river, side by side, in an arc of a circle having its convexity towards the upper part of the river; and a sort of key-voussoir was formed by a vessel 116 feet long and 22 feet wide, which was moored in the river where the current was the most rapid. Baulks and planks were placed, as usual, above the rafts to form the road. The breadth of the river at that place is about 1080 feet. (Berard, *Equilibre des Voûtes.*)

A strong raft-bridge was formed by the Russians and Prussians over the Elbe near Dresden, in 1813: one course of logs disposed parallelwise to each other formed the bottom of each raft; cross-timbers were laid above these; and over them was a third course of timbers, each placed above the interval between two of those below it. The timbers were well lashed together; a strong cable was stretched across the river on each side of the bridge, which was further retained in its place by anchors, and a road was formed of planks as usual. While the British army was serving in Spain during the late war, the roofs of buildings were occasionally taken to form rafts: the rafters served as baulks; and, for want of nails, the planks were kept down to the timbers by ribands formed of young trees split in two longitudinally and tied by willow twigs.

A cask bridge is sometimes formed in the following manner:—a certain number of casks are placed side by side, so as to form a sort of floating pier, having their axes in horizontal positions; the casks are lashed to two gunwale timbers, as they are called, which extend along the upper side of the pier at the extremities of the casks; two of these piers are placed at an interval of about ten feet from each other, and they are connected together by the baulks which support the platform. As many of these rafts are prepared as may be necessary, they are rowed to their places in the line, and the bridge is formed in the same manner as the pontoon-bridge above described.

When the formation of a bridge extending over a river from one bank to another becomes impossible, numerous expedients are had recourse to for conveying troops across by means of what are called flying or moving bridges. We learn from Arrian that the army of Alexander passed the Indus by means of boats and rafts of timber, the latter being supported on bags made of skin and inflated with air; and in a similar manner the infantry of Hannibal is said by Livy to have crossed the Rhine. In India, at the present time, the passage of rivers is often effected by means of basket-boats, which are formed of split bamboos and covered with half-dressed hides. Each vessel is said to be capable of containing about thirty men.

In 1811, Capt. Squires, of the Engineers, formed a bridge over the Guadiana by fixing trestle-piers in the shallow parts of the river and mooring boats in the middle; but just as the bridge was finished, the river swelled and carried away the trestles. The boats were then converted into flying bridges, to convey over the cavalry and artillery; and a slight narrow bridge was made for the infantry with pontoons and casks, the latter being taken from the neighbouring villages.

For many interesting particulars relating to the passage of rivers in military operations, see Sir Howard Douglas's *Essay on Military Bridges*, second edition.

PONTO'PHILUS, Dr. Leach's name for a genus of Shrimps (*Egeon*, Risso).

PONTO'PPIDAN, ERIC, born at Aarhuus in Jutland, was the son of Louis Pontoppidan, a clergyman who wrote several ascetic works, besides a 'Theatrum Nobilitatis Danicæ, in quo familiæ illustrium heroum, aliorumque genere ac virtute excellentium virorum genealogia, recensentur,' 2 vols. fol. Eric studied at Fredericia, and afterwards at Copenhagen, where he took his degree in divinity. He was afterwards preceptor to several young noblemen, with whom he travelled; and subsequently he was appointed minister of a country parish in Holstein, and in 1735 he was numbered among the king's chaplains. In 1738 he was appointed to a chair of theology in the university of Copenhagen; and in 1747 he was made bishop of Bergen in Norway. He was the author of numerous works, both in Danish and Latin, upon historical, religious, and antiquarian subjects. The principal are:—1, 'Theatrum Daniæ veteris et modernæ,' 4to., 1730, being a description of the geography, natural history, antiquities, &c. of the kingdom of Denmark. The author afterwards treated the same subject at much greater length in a work written in the Danish language. 2, 'Den Danske Atlas,' in 7 thick vols. 4to., most of which were published after his death, and which give a complete and elaborate topographical description of Denmark, accompanied by maps, views, and plans of the various towns, engraving of curious coins, inscriptions, monuments, costumes, and other remarkable objects, with an introduction to the history of the country, the genealogy of its kings, and other particulars relative to its history. 3, 'Gesta et Vestigia Danorum extra Daniam,' 2 vols. 8vo., 1740. In this work Pontoppidan gives the history of the old Danish race; its migrations to Britain, France, and other countries; the exploits of its warriors, &c. In his narrative the author is considered as having allowed himself to be carried by national feelings beyond the bounds of critical discrimination. 4, 'Annales Ecclesiæ Danicæ,' 4 vols. 4to., a good history of the church of Denmark. 5. 'Marmora Danica selectiora,' in fol., in which the author copies a number of inscriptions of various ages, which elucidate the history of his country. 6, 'Det förste forsög paa Norges naturlige historie,' 4to., 1752, being an essay on the natural history of Norway, translated into English in 1755; a curious work, but exhibiting marks of considerable credulity, especially concerning the enormous sea-serpents, the kraaken, and other fabulous monsters. 7, 'Memoriæ Hafniæ,' a good description of the city of Copenhagen. 8, 'Origines Havnienses,' a history of the same city. 9, 'Glossarium Norvegicum,' or collection of obsolete words in that language, Bergen, 1749. 10, 'A Manual of Religion, in Danish, or Explanation of Luther's Catechism,' a work which has been translated into German and Icelandic, and is used in schools throughout all the Danish monarchy.

Pontoppidan died at Bergen, in 1764. His relative, Christian Joachim Pontoppidan, published two good maps of Norway in 1785 and 1795.

PONTUS, a country of Asia Minor, derived its name from the expression 'on the Pontus Euxinus' (ἐν Πόντῳ), and was used rather as a political than a geographical division of country. Under Mithridates the Great it included the whole of Paphlagonia and part of Bithynia; but the name is usually applied to the country between Colchis and the river Halys, and is consequently bounded on the west by Paphlagonia, on the south by Cappadocia, and on the east by Colchis. The boundary between Colchis and Pontus is differently given by different writers; Ptolemy places it as far as the Phasis, and Strabo at Trapezus. (Strabo, xii., p. 548.) On the south Pontus is separated from Cappadocia by a lofty range of mountains called Paryadres. The north-eastern part of Pontus is exceedingly barren, and was inhabited by various barbarous tribes, of whom Xenophon has given some account in the 'Anabasis.' The western part of the country, which is very fertile, is well drained by the Iris (*Yeshil-ermak*) and the Thermodon (*Thermeh*), and affords good pasture for numerous flocks. The district of Phanarœa was considered the most fertile part of Pontus, producing wine, oil, and many other things. (Strabo, xii., p. 556.)

The name of Pontus, as a separate kingdom, does not occur either in Herodotus or Xenophon. In the time of those writers the country appears to have been inhabited by various independent tribes; it was first erected into a separate kingdom by Ariobarzanes I., about the beginning of the fourth century before the Christian æra. According to the concurrent testimony of several antient writers, Ariobarzanes was descended from one of the seven Persian chiefs who overthrew the Magi, B.C. 521. (Florus, iii. 5; Diod., xix. 40; Polyb., v. 43.) Ariobarzanes was succeeded by Mithridates I., and Mithridates by Ariobarzanes II., B.C. 363; but it was not till the reign of Mithridates II., who succeeded Ariobarzanes, B.C. 337, that the kingdom of Pontus acquired any degree of political importance. In the troubles which followed the death of Alexander the Great, Mithridates was enabled to extend greatly his paternal dominions, whence he is frequently called the founder (κτίστης) of the kingdom of Pontus. [MITHRIDATES II.] Mithridates died B.C. 302, and was succeeded by his son Mithridates III., who died B.C. 266, leaving the crown to Ariobarzanes III., who expelled from the country, in conjunction with the Gallo-Græci, an Egyptian force sent by Ptolemy. Ariobarzanes III. was succeeded by Mithridates IV., who died about B.C. 190, leaving the crown to his son Pharnaces I. Pharnaces conquered Sinope (Strabo, xii., p. 545), and carried on war against Eumenes II., king of Pergamos. Pharnaces was succeeded by Mithridates V., surnamed Euergetes, and the latter by his son Mithridates VI., surnamed Eupator, B.C. 120. The war of Mithridates with the Romans, which ended in B.C. 63 by the conquest of Pontus and the death of Mithridates, is given under MITHRIDATES VI.

Pharnaces II., the son of Mithridates, who had deprived his father of the throne, was rewarded for his treachery with the kingdom of the Bosporus and the title of an ally of the Romans. (Dio., xxxvii. 14; Appian, *Mithr.*, c. 113.) The greater part of the kingdom of Pontus was annexed to the Roman province of Bithynia, and the remainder was given to Deiotarus, tetrarch of Galatia. In the civil wars between Pompey and Cæsar, Pharnaces attempted to obtain his hereditary dominions in Pontus, but he was defeated by Cæsar, in B.C. 47, and murdered after his escape to the Bosporus. (Suet., *Cæs.*, c. 35; Plut., *Cæs.*, c. 50; Appian, *Civ.*, ii. 91; Dio., xlii. 45-48.) Pharnaces left a son Darius, who was made king of Pontus by Antony, in B.C. 39 (Appian, *Civ.*, v. 75); but he was soon deposed, and Polemo appointed in his stead. (Dio., xlix. 25; Plut., *Anton.*, c. 38.) Polemo was killed in an expedition against the barbarians of Sindice, and was succeeded by his widow Pythodoris. (Strabo, xii., p. 556.)

Pontus was reduced to the form of a province by Nero (Suet., *Ner.*, c. 18), and was subsequently divided into three districts, called respectively Pontus Galaticus, Cappadocius, and Polemoniacus. In the time of Constantine another division of the province was made; the western part, which included Pontus Galaticus and Cappadocius, being called Helenopontus after Constantine's mother, and the eastern part preserving its name of Pontus Polemoniacus.

The history of the kings of Pontus is given in an appendix to the third volume of Clinton's 'Fasti Hellenici,' from which the preceding account has been chiefly taken.

After leaving Colchis, the first town of importance on the coast is Trapezus (*Trebizond*), a colony of Sinope. (Xen., *Anab.*, iv. 8, s. 22.) We learn from Arrian (*Periplus Pont. Euxin.*) that Trapezus was the most important town on the coast in the time of Hadrian. Tacitus also speaks of it (*Hist.*, iii. 47) as an antient and flourishing town. In the reign of Gallienus, Trapezus was taken and plundered by the Goths. (Zosimus, i., p. 32, 33.) In the thirteenth century it became the seat of a small empire under Alexius, a descendant of the Comneni (Gibbon's *Decline and Fall*, c. 61); and it retained its independence till the conquest of Constantinople by the Turks, to whom it was surrendered, A.D. 1461. Trebizond is still an important town. [TREBIZOND.]

Following the coast, the next town we come to west of Trapezus is Cerasus, afterwards called Pharnacia (*Kheresoun*), from Pharnaces, king of Pontus. Several antient writers say that Pharnacia and Cerasus were two different places; but since the antient Pharnacia is called at the present day Kheresoun, there cannot be much doubt that they are the same place, after the express testimony of Arrian (*Peripl.*) to that effect. Cerasus was a colony of Sinope (Xen., *Anab.*, v. 3, § 2), and was probably the place from which Lucullus first brought cherries into Europe. (Ammian., xxii. 8.).

West of Cerasus, on the coast, was Cotyora, an important town in the time of Xenophon, and also a colony of Sinope. (Xen., *Anab.*, v. 5, § 3-6.) In the time of Arrian it was a small village, which was owing to the inhabitants having been removed to the more modern town of Pharnacia. (Strabo, xii., p. 548.)

West of Cotyora and also on the coast near the river Thermodon was Themiscyra, celebrated in antiquity as the habitation of the Amazons. Themiscyra is mentioned by Herodotus (iv. 86). It was besieged by Lucullus in the war with Mithridates, and offered a formidable resistance to the Romans. (Appian, *Mithr.*, c. 78.) The last town of importance on the coast was Amisus (*Samsun*), which, according to Theopompus (*apud Strabon.*, xii., p. 547), was originally founded by the Milesians, but subsequently received an Athenian colony, and was called Piræus. It was greatly enlarged and beautified by Mithridates Eupator. (Strabo, xii., p. 547; Cic., *Pro lege Man.*, c. 8.) In the Mithridatic war it was taken by Lucullus, and subsequently came into the power of Pharnaces II. It was freed by Augustus from the tyranny of Straton, and in Strabo's time was in a flourishing condition. (Strabo, p. 547.) Pliny (vi. 2) calls it *liberum:* whence we may apparently conclude that in his time it had the Jus Italicum.

The most important towns in the interior were Amasia, Comana, Zela, and Neocæsarea. An account of Amasia, which was the birth-place of Strabo, is given under AMASIEH. Comana, surnamed Pontica, to distinguish it from a city of the same name in Cappadocia, was situated in the upper valley of the Iris. (Strabo, xii., p. 547.) It was a place of considerable mercantile importance, and was celebrated for its temple of the goddess Ma, who was supposed to answer to the Bellona of the Romans. There were 6000 slaves attached to the temple, the greater number of whom were courtezans. The office of high-priest was one of great honour and emolument. (Strabo, xii., p. 557-559.)

South-east of Comana was Zela (*Zeleh*), an antient temple, erected, according to Strabo (xii., p. 559), on the mound of Semiramis, and celebrated for a temple sacred to the goddess Anaitis. The priest of the temple was also sovereign of the town. Zela received an accession of territory from Pompey, and was made a city. (Strabo, xii., p. 560.)

Neocæsarea was situated to the east of Zela and Comana, on the Lycus. It is not mentioned by Strabo, but was a considerable place in the time of Pliny, and is spoken of by Gregory Thaumaturgus as the most important town in Pontus.

PONTYPOOL. [MONMOUTHSHIRE.]

PONZ, ANTONIO, a highly meritorious Spanish topographer and writer on the fine arts, was born in 1725, at Bexix, in the district of Segorbe in Valencia. His parents, who were persons of great respectability and considerable property, intended to bring him up for the church, and he was sent to pursue his studies accordingly, first at Segorbe, and afterwards at the university of Valencia, at both which places he gave proofs of more than ordinary ability and application. Yet, though he made sufficient progress in theology to be able to take the degree of Doctor, he had very little relish for it, while he had a decided inclination for the belles-lettres, for the study of foreign languages, and for the fine arts. His taste for the latter induced him to take lessons from his friend Antonio Richart, an artist of some repute at Valencia. His enthusiasm, if not his ability, determined him to renounce forthwith all idea of entering the church and to repair to Madrid, where he enrolled himself among the first pupils of the Academy of the Fine Arts. The course of instruction there given was far too methodical to suit his eager impatience, and he therefore determined to set out at once for Rome in the company of some Jesuits who were going thither. He proceeded to Italy in 1751, and, after visiting some other places, fixed himself at Rome, where he continued between nine and ten years, diligently examining all the chief antiquities and works of art, and also acquired considerable skill in the practice of painting, so as to be able not only to support himself, but to collect a number of the most valuable publications on art and antiquity.

From Rome he was attracted, in 1759, to Naples, by the discoveries made at Herculaneum and Pompeii, and the treasures of art he there met with so excited his enthusiasm, that he determined to visit Greece, Syria, and Egypt, and was deterred from that project only by the advice of Arostegui, the Spanish minister at Naples.

Ponz accordingly returned to Madrid; nor was it long before he obtained a commission that engaged him for a very considerable time. The king (Charles III.) was desirous of adorning the library of the Escurial with a series of portraits of eminent literary characters, and the choice fell upon Ponz, who was already spoken of as a person of very superior attainments. He passed between five and six years within the walls of the Escurial, where, when not occupied with his pencil, he found ample employment and recreation in the stores of literature and art there treasured up: he fancied himself, in short, in a second Rome. He there copied Raffaelle's celebrated Virgen del Pez, Guido's Virgen della Silla, and one or two other master-pieces.

Almost immediately after he had completed his labours at the Escurial, namely, the series of portraits placed in the upper library, he was appointed to visit the colleges, &c. of the Jesuits, then recently suppressed in Spain, for the purpose of taking an account of the paintings, &c. contained in them. It is to the circumstance of his being so employed that we are indebted for his 'Viage de España,' in 18 vols., a work of very great interest and value in itself, and not the less so because it affords a fund of information scarcely to be obtained from other sources. While it furnishes a most important contribution to the history of art, it is highly interesting on account of the original remarks and criticisms with which it is interspersed, and which attest the author's taste and learning. This publication and the different tours he made (chiefly through the southern provinces of the kingdom) occupied him from about 1771 to 1790, when his declining health prevented him from completing his plan. He died at Madrid, December 4, 1792.

Ponz was secretary to the Academy of the Fine Arts, to which office he was appointed in 1776, a corresponding member of the Royal Academy of History, and also mem ber of the Society of Antiquaries, London, and of several other learned bodies. Besides his principal work he published another in two volumes, entitled 'Viage fuera de España,' in which we meet with observations on some of the buildings in London.

PONZA, an island in the Mediterranean sea, off the coast of Naples, 20 miles south by west of Mount Circeo, and 35 miles south-west of Gaëta. It is about five miles long and from one to two wide, and in shape like a crescent, the concave side of which faces the mainland of Italy. On the same side is the harbour, which is a natural basin with a narrow entrance, surrounded by high ground, and perfectly safe in all weathers. The island is one continuous rock, mostly barren, but affording some pasture for cattle. Round the harbour are ranged some buildings, consisting of a castle, which is used as a state prison by the government of Naples, with a small garrison in it, and some other buildings, houses, and huts occupied by persons attached to the garrison and by fishermen. The Roman name of the island was Pontia. It was colonised by the Volsci from the opposite coast, and afterwards came into the possession of the Romans. About four miles west of Ponza is the smaller island of Palmarola, or Palmaria, and two miles north-east of Ponza is an uninhabited rock called Zannone. About 24 miles south-east of Ponza, and halfway between it and the island of Ischia, is the island of Vandotene, the antient Pandataria, whither Julia the daughter of Augustus was banished by her father in consequence of her dissolute conduct. Octavia the wife of Nero was also banished to Pandataria, and put to death there by order of her husband. Vandotene is about two miles long, and is inhabited by sailors and fishermen. East of Vandotene, and separated from it by a narrow channel, is the smaller island of Santo Stefano. The whole group of these islands is of volcanic formation.

(Fortis, 'Osservazioni Litografiche su l'Isole di Vandotene e Ponza,' in the 3rd vol. of the *Saggi Scientifici dell' Accademia di Padova*, 1794.)

POOLE, a corporate town on the coast of Dorsetshire, in 50° 43′ N. lat., and 1° 58′ W. long., 98 miles in a direct line south-west by west of St. Paul's, London, or about 116 miles from the General Post-office by the South-Western Railway to Southampton, and thence by Ringwood. The origin of Poole is unknown; it is supposed to have been an antient demesne of the crown granted to William Longespee, a natural son or descendant of Henry II. Longespee gave a charter to the burgesses of Poole, the date of which is not ascertained. This charter was confirmed by William Monteacute, earl of Salisbury, 45 Edward III., and by subsequent earls or by the crown. In 1365 Poole was made a magazine for the wars of Edward III. in France. After this period it decayed, but in the reign of Henry VI. it revived. It is likely that its early prosperity depended upon the vigour with which the war in France was carried on. In Leland's time it flourished, and in the reign of Elizabeth was resorted to by Spanish merchants. In the civil war it had a garrison of parliamentarians, who were troublesome neighbours to the royalist detachments in the county.

The town is upon a considerable inlet of the British Channel, which forms the harbour, and opens into the bay that lies between Hengistbury-head and Durlston-head. This inlet has a very narrow entrance which faces the east; it extends several miles inland, forming, when the tide is up, a large sheet of water, but presenting, when the tide is out, an assemblage of mud-banks divided by narrow channels. In the harbour are several islands; one of them, Brownsea island, having an area of several hundred acres, handsomely laid out, and some good buildings on it. The town occupies a peninsula on the north side of the harbour, and consists of several streets irregularly laid out, the principal of them running from north to south. The borough is co-extensive with the parish of St. James, and comprehends an area of 170 acres. The number of inhabited houses was, in 1831, 1315, besides 76 uninhabited and 11 building. The number of families was 1426, of persons 6459, besides 1119 mariners employed in registered vessels belonging to the port. The town had outgrown in some parts the corporate limits, and it may be calculated that its population in 1831 (exclusive of the mariners) was considerably above 7000, and has since then increased. A small suburb has grown up, separated from the town by an inlet of the harbour, over which there is a bridge. The houses in Poole are generally of respectable appearance, and some of them are of a superior class. The streets are paved: they are lighted and watched under a local Act. The guildhall was built in the middle of the last century, and there are a neat subscription and news room erected of late years, and a building for the public library. The church of St. James has been rebuilt of Purbeck stone; and there are an Episcopal chapel and several dissenting meeting-houses. There are a tolerably large gaol and house of correction for the borough, a custom-house, and an edifice of some antiquity, the king's hall or wool-house.

The trade which was formerly carried on with Newfoundland has much declined, but the coasting-trade has considerably increased. The quays have been much enlarged and improved, and the harbour is one of the safest and best on the Channel coast. The number of vessels from foreign parts which entered inwards in the years 1831, 1832, and 1833, averaged for each year about 100 with cargoes, and 20 in ballast; the average number which cleared outwards for foreign ports was above 110 with cargoes, and 45 in ballast; the number of coasters entered inward on the average of the same years was about 590 with cargoes, and nearly 350 in ballast; cleared outwards, nearly 1500 with cargoes, and 95 in ballast. The number of registered vessels belonging to the port in 1833 was 158. The clay found in the island of Purbeck is shipped here for the use of the potteries in Staffordshire or elsewhere; from 25,000 to 30,000 tons are shipped yearly. A considerable trade in corn is also carried on; and there are building-yards for vessels, and rope and twine walks. Sail-cloth is manufactured, and an active oyster and other fishery carried on.

The corporation of Poole, under the Municipal Reform Act, consists of 6 aldermen and 18 councillors. As the town is a county of itself, there is a sheriff annually elected by the burgesses. The borough had been much extended for parliamentary purposes, and the parliamentary limits have been adopted for municipal purposes until altered by parliament: it is divided into two wards. Quarter-sessions for the borough are held, and a weekly Court of Record, having unlimited jurisdiction in all cases, real, personal, or mixed. The sheriff holds a county court when necessary.

Poole returned two members to parliament in the 13, 36, and 42 Edward III.; it then discontinued sending them until 31 Henry VI., when the privilege was resumed, and has been continued ever since. The number of voters registered in the year 1835-36 was 498. The living of St. James at Poole is a perpetual curacy, of the clear yearly value of 307*l*., with a glebe-house; it is in the peculiar jurisdiction of Canford.

There were in the parish of St. James in 1833 twenty-nine infant or dame schools, with 455 children; an endowed free school with 22 boys; two Lancasterian schools, with 155 children; fourteen other day-schools, with 272 children; three boarding-schools, with 48 children; and five Sunday-schools, with 809 children: three of the Sunday-schools have lending libraries attached.

POOLE, MATTHEW, a learned non-conforming divine of the English Church, author of the well-known and useful book, 'Synopsis Criticorum Biblicorum.' He was born at York about the year 1624, and inherited from his family a good estate in that county. He was educated in Emmanuel College, Cambridge, but we have been unable to trace the circumstances of his history, till we find him, in 1662, in possession of the church of St. Michael le Querne in London, which he resigned, being unable to comply with the terms of ministerial conformity imposed by the Act of Uniformity passed in that year. Previously however he had exerted himself successfully in a scheme for the education of persons intended for the ministry, which was liberally patronised, of which, in 1658, he printed an account, in a book entitled 'A Model for the maintaining of Students of Choice Abilities in the University, and principally in order to the Ministry.'

Being ejected from his cure, and prohibited from the exercise of his ministry, he had leisure to devote himself to the completion of the great work which has made his name so extensively known. The design was nothing less than to bring into one view whatever had been written by critics of all ages and nations on the books of Holy Scripture. This, after ten years' labour, he completed, and the first two volumes appeared in 1669. These were followed by three other volumes, forming together five large folios, of which an extensive edition was printed. The work was perhaps as good as a work of the kind can be, and few will deny that it is a very valuable and useful abridgement; but synopses and abridgements are rather for the multitude than for scholars, who are rarely satisfied with the opinions of any author which are thus presented to them at second-hand and without that fulness of illustration which the author himself had given; yet, being written in the Latin language, it is manifest that the compiler contemplated a work adapted to the necessities and tastes of Biblical scholars. Its chief use may perhaps be said to be as a convenient body of exegetic criticism for Biblical students who are placed in situations which cut them off from convenient access to large libraries.

Besides this, there is an English work by the same author, 'Annotations on Scripture,' which was left by him unfinished, but completed by several of his non-conforming brethren. This work appeared in two volumes, folio, 1685.

He was also engaged in most of the controversies of his time: he attacked Biddle on the Socinian question; he published a defence of the non-conforming clergy in 1662; he wrote against the intrusion of laymen into the ministerial office; and he was the author of 'The Nullity of the Romish Faith,' 1666, and of other treatises in the controversy with the Papists. He retired to Holland to find the toleration which was denied him at home, and died at Amsterdam in 1679.

POOLE'S HOLE. [Derbyshire.]

POONAH, a city of Hindustan, in the presidency of Bombay and province of Aurungabad, is situated at the confluence of the rivers Moula and Mouta. It is about 80 miles south-east from Bombay, direct distance; in 18° 30′ N. lat. and 73° 52′ E. long.

Poonah stands on an extensive plain, or rather tableland, which is about 2000 feet above the level of the sea, and is bordered by hills which rise 1500 or 2000 feet above the plain itself. These hills are steep and rugged, and, previous to the conquest of the Mahrattas by the British forces in 1818, many of them were crowned by hill-fortresses, which are now however nearly all destroyed or fallen into decay. There are a few gardens in the suburbs of the city, but as both the gardens and the city lie in a hollow, the general appearance of the surrounding plain is naked and desolate.

Poonah was formerly the seat of the Mahratta sovereignty, and the residence of the Peishwa. It is not a handsome city, nor apparently of large size, though its extent must be considerable, since its population in 1819 was estimated by Mr. Elphinstone at 115,000, and Bishop Heber in 1825 was informed that it then amounted to about 100,000. The city is not walled, the houses are very irregularly built, and the streets are ill-paved and interspersed with peepul-trees. The bazars are mean: there are many pagodas, but none of them either large or handsome.

The palace of the Peishwa was large, and had a handsome quadrangle surrounded by cloisters of carved wooden pillars, but the external appearance was not striking. When Bishop Heber was there in 1825 the ground-floor of the principal building was used as a prison, and the floor immediately above as a dispensary; a large audience-chamber was fitted up as an infirmary for the natives, and a long gallery above this was converted into an hospital for the insane. A fire broke out in this palace in 1828, but we have not the means of ascertaining to what extent it was destroyed. Other small residences of the Peishwa were called 'Monday's Palace,' 'Tuesday's Palace,' &c. The most beautiful object is the temple of the goddess Parvati (the mountain-goddess), situated on an isolated and rather lofty hill immediately over the town, and at the bottom of which is a large tank surrounded by gardens.

A school for the instruction of the indigent was founded at Poonah in 1829.

The British have a military cantonment a little to the west of Poonah, which is laid out in wide streets and well arranged. It is much resorted to by visitors from Bombay.

The territory conquered from the Mahrattas in 1818 has, with the exceptions mentioned in the article Deccan, been divided into four collectorates, of which Poonah is one. Each collectorate is under the management of an officer with the title of collector, who is generally a military man, but who also exercises the functions of a judge of circuit and magistrate; but there is a chief commissioner over all, who resides at Poonah.

For an account of the Mahratta war and of the successive Peishwas who resided at Poonah, see the article Mahrattas.

The cave-temple of Carlee, to which reference is made in the article Aurungabad, is about a mile from Carlee, which is the last village on the great road across the Western Ghauts from Bombay to Poonah. The temple is hewn in the face of a rocky precipice, two-thirds up the side of a steep hill which is about 800 feet above the plain, and is approached by a narrow path winding up the side of the hill among trees and brushwood and fragments of rock. Besides the principal temple, there are many smaller apartments and galleries, in two stories, some of them beautifully ornamented. A mean and ruinous temple to Siva serves as a sort of gateway to the cave, and a similar small building stands on the right hand of its portico. The approach to the temple itself is under a noble arch filled up with a sort of portico screen in two stories of three intercolumniations below and five above. On the front of the portico, but a little to the left, is a high octagonal pillar, surmounted by three lions placed back to back. Within the portico, to the right and left, are three colossal sculptures of elephants, in alto-rilievo, with their heads, tusks, and trunks projecting boldly from the wall. On each of them is a driver, very well carved, and a palanquin, with two persons seated in it. The internal screen of the vestibule leading to the temple is covered with alti-rilievi of male and female figures, somewhat larger than life. The temple itself is about sixty feet long by thirty wide, surrounded on every side but that of the entrance with a colonnade of octagonal columns, the capitals of which consist of a large cap like a bell, finely carved, and surmounted by two elephants with their trunks entwined, and each carrying two male figures and one female. The roof is decorated with ribs of timber, which are not for support, but have a fine effect in the perspective of the interior. There is no image of Budda or any other idol in this temple.

(Heber's *Narrative of a Journey through the Upper Provinces of India in* 1824 *and* 1825; Mrs. Postans's *Western India in* 1838.)

POOR LAWS AND SETTLEMENT. A sketch of the early history of the English poor-law, down to the 43 Eliz., c. 2, will be found in the article Pauperism. Some account is also there given of the great evils which ensued from the subsequent maladministration of the law, and finally created the necessity for the Poor-Law Amendment Act (4 & 5 Wm. IV., c. 76). It will be convenient to state how the law stood previously to the passing of this Act, and then to notice some of its leading provisions.

Every indigent person, whether a native or a foreigner, being in any district of England or Wales, in which a fund is raised for the maintenance of the poor, has a right to be supplied with the necessaries of life out of that fund. This right depends on statute, and principally on the 43 Eliz., c. 2, which enacts that the churchwardens of every parish, and four, three, or two substantial householders there, to be nominated yearly under the hands and seals of two or more justices of the peace, shall be called overseers of the poor. [Overseers.] Under this statute overseers could be appointed for parishes only. This proved very insufficient, because many large and populous districts were not situate within any parish, and consequently no overseers whatever could be appointed for them; and also because many parishes themselves were of such magnitude that one set of overseers could not properly attend to all the poor. To supply this defect, the 13 & 14 Car. II., c. 12, authorised the appointment of overseers in any township that was either extra-parochial or was part of a parish so large as to require distinct sets of officers for the management of its poor. Townships are sometimes created also by local acts.

It is the duty of these overseers to raise and administer the fund for the relief of the poor of their district. This fund, which is called the poor-rate, they are directed by the statute of Eliz. in parishes, and by the statute of Car. II. in townships, to raise 'weekly or otherwise, by taxation of every inhabitant, parson, vicar, and other, and every occupier of lands, houses, tithes impropriate, propriations of tithes, coal-mines or saleable underwoods in the said parish, in such competent sum and sums of money as they shall think fit, &c. according to the ability of the parish.'

These provisions are still however, even since the 4 & 5 Wm. IV., c. 76, very inadequate. Overseers cannot be appointed, nor can a poor-rate be levied in any place that was not anciently either a parish or a township. Many districts which are very populous at the present day form no part of any parish or township; and the poor of such districts, if unable to remove themselves to a parochial division of the country, where they will be entitled to relief, may, as far as the law is concerned, perish from want.

The rate may be made according to the exigencies of the place, which, whether parish or township, may conveniently in either case be called a parish, for any period not less than a week nor exceeding a year. The rate, which is made in writing, gives the names of the persons rated, a description of the property for which they are rated, and the amount payable by them; it contains also a declaration, signed by the parish officers, that the rate is, to the best of their belief, correct, and that they have used their best endeavours to make it so. The rate so made and signed must be taken to two justices for their assent, which is called the allowance of the rate, and public notice of such allowance must be given on the Sunday following, or the rate will be entirely void.

As the statute expressly mentions both inhabitants and occupiers, inhabitants were held liable to be rated in proportion to their ability within the parish, although they had no property there which was capable of occupation, and occupiers of property therein were held liable although they resided elsewhere. Accordingly both real corporeal property and personal property within the parish may be assessed, as constituting 'the ability of the parish;' real corporeal property, as land or houses, may be assessed, wheresoever the occupier resides, and personal property, if the owner is resident within the parish. Incorporeal real property, since it is not the subject of occupation, seems not to be rateable unless incidentally, when, as in the case of the tolls of a canal, it is, as it were, annexed to and enhances the value of corporeal real property, which is the subject of occupation. As it is the occupier and not the owner of real corporeal property who is rated for it, it will be obvious that the term 'real property' is not used in the poor-laws according to its strict legal sense, and that the occupier of a house is rated for it, although he has a mere chattel interest in it. The term 'personal property' is also used in a restricted sense; it denotes stock in trade, and such things as are not at all of the nature of realty, and excludes chattels real. The assessment is laid in respect of the revenue or annual profit of the property rated, whether real or personal. Such property therefore as is incapable of yielding profit is not rateable. The assessment upon land and houses, &c. is calculated upon an estimate of their net annual value, which is defined to be the rent at which they would let from year to year, free of all tenant's rates and taxes, and tithe commutation rent-charge, if any, and deducting the probable average of annual costs of repairs, insurance, and any other expenses which may be necessary to maintain the premises in a state to command such rent. Personal property was not rated unless it had, as it were, a local existence; and therefore neither stock in the funds nor money was rateable. Furniture also was exempted, because it yielded no profit. In practice the only kind of personal property ever rated, and that in very few places, was stock in trade and ships. The rating of this species of property was attended with many disadvantages. The rate was to be made on the profit, which was defined to be not the whole profit, but the excess after payment of debts. Thus it was nearly impossible to ascertain the rateable amount of such property, and the proprietor might always evade the tax by residing out of the parish. So long however as personal property was rateable by law, the omission of it in the rate was a ground of appeal, because all persons liable are to be rated equally according to their ability. The inconvenience of this state of things induced the legislature during the present session of parliament (1840) to enact (by 3 and 4 Vict., 4, c. 89) that no inhabitant should be rated for his stock in trade or other property. The word 'inhabitant' may now be considered as struck out of the statute of Elizabeth; nobody will have to contribute henceforward to the poor-rate except in his character of occupier. Personal property therefore is no longer rateable.

It is unnecessary to make any detailed remarks on tithes and other property which, by the statute of Elizabeth, are expressly made chargeable.

If a parish is unable to furnish a sufficient sum for the maintenance of its poor, any other parish in the same hundred, with the sanction of two justices, or in any other part of the county, with the sanction of the justices at quarter-sessions, may be called upon to assist the less solvent parish. This is called rating parishes in aid.

The overseers are to collect the rate from the persons rated. If a person rated do not pay when called upon, the overseers may obtain a summons from two justices, requiring him to show cause why a warrant should not issue to levy the rate by distress and sale of his goods; and, if no sufficient cause is shown, the payment is enforced accordingly. The party so summoned may show for cause that the rate itself is void, or that he is not liable; he may also, with the consent of the overseers, be excused, if it appear that he is unable to pay through poverty. He may also appeal against the rate, and notice of appeal deprives the magistrates of their jurisdiction to distrain until the appeal is decided, unless the objection is solely on the ground of overcharge, in which case the warrant may issue for such a sum as the property was rated at in the last valid rate. The appeal againt the rate on the ground of inequality, unfairness, or incorrectness in the valuation of the property rated may be to justices at petty-sessions, from whose decision a second appeal lies to the general quarter-sessions. The appeal, on the above grounds, may also be taken to the quarter-sessions in the first instance. If the objection be to the principle of the rate itself, or it is intended to dispute the liability of the property to be rated, the appeal lies to the quarter-sessions only. In all these cases of appeal, notice of appeal and of the precise objections to the rate must be given to the parish-officers, and also to any rated inhabitants that may be interested in opposing the appellant, as, for instance, where his ground of complaint is that they have been under-rated.

The overseers, who in some parishes act under the direction of a select vestry, and are assisted by assistant overseers, are to apply the poor-rate to the relief of the poor of their parish. The poor of the parish are, in one sense, all those who happen to be in the parish at the time of their being in distress; for the parish in which they happen to be is bound to afford such paupers immediate, or, as it is called, casual relief. But if the same parish were bound also to afford continued relief to, or permanently to maintain, all the destitute who should come within it, the burden of supporting the poor might press very unequally upon different parishes. Paupers would then, influenced by their own fancy, or instigated to exonerate some other parish, have the power of fastening themselves for ever on any particular parish, or of roaming at pleasure from one parish to another in unrestricted vagrancy. The 13 & 14 Car. II., c. 12, was passed to obviate these evils, and is the foundation of the present law which determines the parish that a pauper belongs, and gives the power of removing him to it. This law is called the law of settlement. The statute enables two justices, upon complaint made by the churchwardens or overseers of the poor of any parish, to any justice of the peace, within forty days after a person coming to settle there, in any tenement under the yearly value of 10*l*., by their warrant to remove such person to the parish where he was 'last legally settled, either as a native, householder, sojourner, apprentice, or servant, for the space of forty days at the least.' Later statutes have greatly modified the heads of settlement here enumerated, and have added others; they have also made a pauper irremovable, until he has become chargeable to the foreign parish by receiving relief from it, either in person or through the hands of his wife or children.

The following are the settlements that subsisted at the passing of the Poor-Law Amendment Act:—settlement by birth, parentage, marriage, hiring and service, apprenticeship, renting a tenement, estate, office, payment of rates. Settlements may be divided into two general classes; being, first, natural or derivative settlements, as by birth, parentage, or marriage, to the perfection of which residence in the parish is unnecessary; secondly, acquired settlements, including all the remaining settlements above mentioned, and to these residence for forty days in the parish is necessary. The following were the modes of acquiring the various settlements which have been enumerated:—1, settlement by birth.—In order that children may not be separated from their parents, the settlement of the father during his life, and the settlement of the mother after his death, is the settlement of the children. But legitimate children who have no known settlement are settled in the place of their birth; so also are illegitimate children, for they can derive neither settlement nor any thing else from their parents. Children however, during the age of nurture, which continues till they are seven years of age, must not be separated from their parents, and are therefore to be supported in the parish where their parents happen to be, at the expense of the parish of their birth settlement. 2. Settlement by parentage.—The settlement of the father, or, if he have none, the maiden settlement of the mother, is communicated to legitimate unemancipated children. After the father's death their settlement shifts with that of the widow, until she marry again, in which case the settlement of her new husband is not communicated to them. A child is said to be unemancipated so long as he forms part of the parent's family. A child is emancipated when he gains a settlement of his own, or, being of the age of twenty-one, lives apart from and independently of the parent, or contracts some relation inconsistent with his continuing a subordinate member of the parent's family, as by marrying or enlisting as a soldier. Any settlement of the parent acquired after the child's emancipation is not communicated to him. 3. Settlement by marriage.—To prevent the separation of husband and wife, the settlement of the husband is communicated to the wife; she can acquire no settlement during marriage; and, if he have no settlement, she cannot be separated from him by removal to her maiden settlement. 4. Settlement by hiring and service is acquired by a person unmarried, and without unemancipated children, hiring himself for a year into service, abiding for a year in the same service, and residing for forty days in any parish within the year, and with a view to the service. A general hiring, that is, a hiring where nothing is said as to the duration of the contract, is considered a hiring for a year. The service for the year need not be wholly under the hiring for a year, it is sufficient if part of the service be under such hiring; the residue may be either under another hiring, or under no hiring at all. The settlement is gained in the parish where the servant last *completes* the residence of forty days—the forty days need not be consecutive days; if the servant reside thirty-nine days in parish A, then forty days in parish B, and finally another day in A, A, where he last completed a residence of forty days, will be the place of his settlement. All the forty days must be within the compass of a single year, but it is sufficient if the residence for any part of the forty days be under the yearly hiring. 5. Settlement by apprenticeship is gained in the parish where a person bound by deed as an apprentice last completes a residence of forty days in his character of apprentice. No service is required, but the apprentice during the necessary period of residence must be under his master's control. 6. Settlement by renting a tenement is acquired by hiring and actually occupying a tenement at the rent of at least 10*l.* a year, payment of rent to that amount, and residence for forty days in the parish where the tenement is. By actual occupation is meant that no part of the tenement must be underlet. 7. Settlement by estate is gained by the possession of any freehold, copyhold, or leasehold property, and residence for forty days in the parish where the estate lies. If the estate come to a party in any way except by purchase, the value of the estate is immaterial; but a purchased estate confers no settlement if the price given was under 30*l.* But a person residing on his estate, whatever may be its value, is by Magna Charta irremoveable from it while so residing, although he may have gained no settlement in respect of it. 8. Settlement by office is gained by executing any public office in a parish, such as the office of constable, sexton, &c. for a year, and residing there forty days. The office need not be of a parochial nature, but it must be at least an annual office. 9. Settlement by payment of rates.—In order to acquire this settlement a person must have been rated to and have paid the public taxes of a parish, in respect of a tenement hired at a rent of 10*l.* a year, and have paid that amount of rent, and resided forty days in the parish of the tenement. This head of settlement therefore includes all the requisites of settlement by renting a tenement, except the requisite of actual occupation.

All persons whatsoever, whether natural born subjects of England and Wales, Scotchmen, Irishmen, or foreigners, may gain a settlement in this country. A chargeable pauper is to be removed to the place where he last acquired a settlement. It is often very difficult to find out the place of such last settlement; this is so more especially in cases of settlement by hiring and service and apprenticeship, where the residence, being unconnected with anything of a fixed nature, as a tenement or office in any particular parish, may be continually shifting, the settlement consequently shifting with it, until the last day of the service or apprenticeship. Paupers who have no settlement must be maintained by the parish in which they happen to be, as casual poor, unless they were born in Scotland or Ireland, or in the islands of Man, Jersey, or Guernsey, in which case they are to be taken under a pass-warrant of two justices to their own country. When a pauper has become chargeable, and it is sought to remove him, he is taken before two justices, who inquire as to his place of settlement, and, if satisfied, upon his examination and such other evidence as may be laid before them, make an order for his removal thither. The parish to which he is removed may dispute its liability by appeal to the quarter-sessions, when the order of removal will be quashed, unless it appear that the pauper is settled in the appellant parish.

The Poor-Law Amendment Act (4 and 5 Wm. IV., c. 76) has made no change in the law respecting the rateability of property or the mode of collecting the rate. The act does not apply itself to the rate until collected; it then takes up the rate for the purpose of securing a better distribution of it. To this end the administration of relief to the poor throughout England and Wales is subject to the control of three commissioners. Their powers, and the new agency established for the administration of relief under their direction, have been already described. [PAUPERISM.] In parishes or unions where there are guardians or a select vestry, relief is to be given solely by such guardians or vestry, or by their order, unless in cases of urgent distress. In these cases an overseer is bound to give temporary relief in articles of absolute necessity, but not in money, and, if he refuse, he may be required to do so by a magistrate's order, disobedience to which is visited by a penalty of 5*l.* In parishes which have no guardians or select vestry, the management and relief of the poor is still left to overseers, subject to the control of the commissioners. But, with the exceptions above stated, the task of relieving the poor is wholly withdrawn from overseers, these officers, from ignorance or corrupt motives, having been generally found incompetent to the discharge of so important a duty. They are still however entrusted with the making and collection of the poor-rate, which they are to pay over to those who have the distribution of it. The general discretionary power which magistrates formerly exercised in ordering relief is also withdrawn. But a single magistrate may still order medical relief, when called for by sudden and dangerous illness; and two magistrates may order relief to adult persons, who from age or infirmity are unable to work, without requiring them to reside in the workhouse. Relief to able-bodied persons cannot be given out of the workhouse, unless with the sanction of the commissioners. In substance, the wants of the poor are as amply supplied as before the Act, but the manner of administering relief is so regulated, by subjecting the applicants for it to the discipline of a workhouse and to other restraints, that the condition of a pauper, living upon the parish fund, is depressed, in point of comfort, below that of the labourer. Thus a ready test is applied to distinguish real and pretended destitution, and a powerful incentive to work is held out to all who can find employment.

The means also of obtaining employment are increased by enlarging the market for the poor man's labour. This is the result of a relaxation in the law of settlement, and particularly of settlement by hiring and service. The old law had been found to obstruct the free circulation of labour by confining the poor to their own parishes. The labourer himself, from attachment to old scenes and associates, was often unwilling to engage himself for a year in a strange parish, lest, by acquiring a settlement there, he should incur, at some future time, a permanent separation from home: the farmer, on the other hand, had an equally strong objection to hire a strange labourer on such terms as to burden his parish with a new settler.

By the Poor-Law Amendment Act a settlement by hiring and service cannot be acquired for the future; but the Act does not interfere materially with settlements previously acquired. Settlements by office and by apprenticeship in the sea service or to a fisherman can no longer be acquired. Settlement by renting a tenement is clogged with the additional qualification that the occupier must have been assessed to the poor-rate, and paid the same for one year. Settlement by estate, like any other settlement, when once gained, used to endure till it was superseded by some new settlement; but now it is converted to a temporary settlement, and to be retained so long only as the proprietor shall live within ten miles of the estate. Settlements by marriage and by payment of rates are untouched. Settlement by parentage and settlement by birth are both affected to this extent, that illegitimate children born after the passing of the Act are to follow the settlement of their mother, until the age of sixteen, or until they acquire a settlement in their own right; instead of taking, as formerly, the settlement of the place of their birth. The effect of this change in the law is that an unmarried woman, whose pregnancy in itself made her chargeable, is no longer hunted from the parish in which she happens to be, in order that the parish may not, by the birth of the child therein, be permanently charged with its maintenance. The old law of settlement was full of legal difficulties and refinements, and the effect of the change in the law has been to relieve parishes from a frightful mass of litigation.

A great change also has been introduced in the general law of bastardy. Formerly the putative father was liable for the support of a bastard, on the unsupported oath of the mother that he was the father of it. Before the birth of the child, he might be called upon to give security to provide for the child, and, if unable to give such security, might be committed to prison; and, after its birth, an order of filiation might be made upon him by two justices out of sessions. By the new Act neither the mother nor the putative father of a bastard can be punished, as was formerly the case. Female incontinence is checked by making the mother liable to maintain her child in the first instance. The putative father is resorted to only in the event of her inability, and no order of maintenance can be made upon him, except at quarter-sessions, and the evidence of the mother must be corroborated in some material particular. By a still more recent Act the order is to be made at petty-sessions, unless the putative father desire that the case may be heard at the quarter-sessions, and give security to abide by the judgment of that court.

Any person who marries a woman having children, whether legitimate or illegitimate, is made liable to maintain them until they attain the age of sixteen, or until the death of the mother.

The compulsory provision for the poor, which has been introduced into Ireland, by 1 and 2 Vict., c. 56, has been already noticed. [PAUPERISM.]

A compulsory provision for the poor has been in force for about two centuries in Scotland. The Scotch law resembles in many respects the English law, but has been more wisely administered. In Scotland however the able-bodied have no legal right to relief. (Monypenny on the 'Scotch Poor-Law;' *Edin. Rev.*, vol. lix., p. 425.)

(Bl.'s *Comm.*, 359; Nolan's *Poor Laws:* Burn's *Justice*, 'Poor;' and Gambier *On the Law of Settlement.*)

POPAYAN. [GRANADA, NEW.]

POPE, ALEXANDER, was born in London, May 22, 1688. His parents were Roman Catholics, and his father, who, according to Pope's own account, was of a noble family, kept a linen-draper's shop in the Strand. In his early years, his father retired to Binfield in Windsor Forest, and here Pope formed his first plans of study, and, while yet a child, determined to be a poet. The 'Pastorals' were composed when he was sixteen, but not published till he was twenty-one (1709), in Tonson's 'Miscellany.' He next produced the 'Essay on Criticism,' and not long after appeared the 'Rape of the Lock,' and 'The Temple of Fame,' a partial imitation of Chaucer. In 1713 he published 'Windsor Forest,' and soon after this date the proposals for a subscription to a version of the 'Iliad.'[*] The whole work was completed between his twenty-fifth and thirtieth year. The fame which it procured for Pope, joined, as is probable, to his own ill-temper, lost him the friendship of Addison, but probably raised him to the place which Addison had filled as leader of the literature of the day. In the translation of the 'Odyssey,' Pope was helped by Broome and Fenton. Pope translated twelve books, Broome eight, and Fenton four.

In 1728 he published 'The Dunciad,' and in 1733 the Essay on Man,' which however was not avowed till the next year, when he wrote his 'Characters of Men, or Moral Essays. These were preceded and followed by 'Imitations of Horace,' and in 1742 the list of his poems concludes with an additional book of 'The Dunciad,' in which Cibber takes the place of Theobald, the original hero. About this time his health declined, and on the 30th May, 1744, he died of asthma and decay of nature.

To enumerate the friends of Pope would be to give a list of the great men of the time. One of his failings was to desire the acquaintance of men of fashion, and his literary supremacy gave him that of men of learning, so that he commanded a very large circle. Among them were Addison, with whom he quarrelled; Swift, to whom he addressed the 'Dunciad;' Atterbury, on whose trial he appeared as a witness for the defence; Bolingbroke, to whom he is said to have owed the maxims of the 'Essay on Man;' and Voltaire.

Pope was short and deformed. It is surprising that he should have lived so long as he did, having both physical infirmity and hard study to contend against, with the addition of a violent temper, over which he had so little control, that he could not avoid showing anger by the very contortions of his countenance. Perhaps there is nothing in the history of literature more remarkable than the popularity acquired by Pope. To attain, in the estimation of a great nation, to the first rank among her poets, themselves the greatest which any nation has to boast, is no mean distinction; but that it should have been acquired on the strength of such poems as Pope has left, is not less wonderful. An enumeration of his principal works will show that, with one or two trivial exceptions, his very subjects were borrowed from some other writer. His 'Pastorals' are a mixture of Virgil and Theocritus, and have little to recommend them, except what is common to all the verses of his school, a beautiful flow of words and an epigrammatic turn of expression. This by convention has received the name of poetry, but if by poetry we mean anything more than ingenious thoughts put into ornamented language, if poetry is indeed to be what the Greeks understood by it, a creation, we shall find little of it here. Even the 'Messiah,' beautiful as it undoubtedly is, has little claim to the title of a poem. Indeed, it professes nothing more than to be an imitation.

The 'Essay on Criticism' is worth notice, as, combined with Pope's preface to his works, it shows very clearly what influence was most predominant in forming the prevailing style of versification in his time. That any man possessed of any measure of poetic spirit should be so tremblingly alive to what others said of him, as in his second work to employ himself in canvassing the merits of critics and the rules of criticism, is certainly not what we might expect. He who has given birth to a high production of the imagination cannot help feeling that its merit rests upon other grounds than the decisions of any man or party of men, and remains satisfied in the pleasure which the exercise of any noble faculty always gives, without troubling himself to inquire what 'the critics' have said upon it, or what is the general verdict of his readers. At the time when Pope wrote however, authorship was reduced to a kind of system. The end in view was to please the readers: the readers themselves were almost entirely of one and that a limited class; the class who read were members of the fashionable world, and frequented coffee-houses, the clubs of those days. At these coffee-houses some one presided; and hence by getting the ear of this president, or, what was better, by taking his place, an author became in great measure the judge of his own work. Dryden's literary supremacy could never recur among us, for it requires a confined class, and a very peculiar state of society to secure so general a reputation. However Dryden obtained it, and, by doing so, set the fashion. The booksellers favoured it, for nothing could be so convenient to them as to have under their command the rulers of literature; and the effect of all this was to make Pope an imitator of Dryden, and all the other poets of the day imitators of Pope, as the person whose style was the most approved by those whom Addison and Pope and their contemporaries call 'the town,' the only literary tribunal then in being. If we were to give a reason for the predominant influence possessed by 'the town' in Pope's days, an influence which continued till the French revolution, we should ascribe it to that revulsion in favour of the court which succeeded the Restoration, and which the unpopularity of James was unable to destroy, joined to the influence which French manners and modes of thought had acquired to the prejudice of the old English spirit of the early part of the seventeenth century.[*]

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[*] A full account of the bargain with Lintot, the price of the work, &c., are given in Johnson's 'Life of Pope.'

[*] A curious instance of Pope's omnipotent authority is given in the notice of SURREY.

The preface which Pope prefixed to his works is quite as remarkable as the 'Essay on Criticism,' in assuming, as it does from beginning to end, that the proper object of a writer is to please. It is curious also, as a memorial of that fashion which poets then followed in dedicating their work to some great man, and in rehearsing patron's names and titles; all which follies Pope ridicules, though at the same time he is governed by the spirit which dictated them, and boasts that he had been 'encouraged by the great, commended by the eminent, and favoured by the public in general.'

Translations and imitations are an important part of Pope's works. Of these the most remarkable are the versions of the 'Iliad' and 'Odyssey,' perhaps the most generally read of all his writings. It is of course pretty well known at present that Pope's claims to the name of a translator are very small. He has contrived to throw an air of Virgilian elegance and courtliness over the simple verses which formed his subject, but it would be hard to show a more thorough disguise than that which the 'Iliad' puts on in Pope's English, and this in spite of his very frequent use of Chapman's version. All scholars will admit that Pope has latinized the 'Iliad,' a very prevalent fault in his day, when Latin held a place so much more important than Greek in the estimation of literary men. For his imitations of some parts of Chaucer this apology may be made, that they were written very early. A comparison of their style with that of Mr. Wordsworth's 'Prioress's Tale,' shows what might have been done, but between Pope and Chaucer there is about the same difference as between a conservatory and a bank of wild flowers in a forest.

In Pope's days it was the fashion to be a philosopher, whence it was necessary for Pope to compose a philosophic poem. It might perhaps have been well to weigh a little the consequences which theories like those of 'The Essay on Man' would have in practice, before making them the foundation of a system; but this was no part of Pope's scheme, and out of his materials, supplied, as is thought, by Bolingbroke,* he has written a poem, many lines of which are immortal, while the sentiments are mostly very mischievous, and the facts not seldom fictions.

In his imitations of Horace, Pope has been most happy: indeed, where the parties have so much in common, it was to be expected that the imitator would be successful. Dazzling point and harmonious verse are combined in these delightful compositions, which are worthy of all praise. Indeed these are the characteristics which have given Pope his popularity. But they do not constitute poetry, nor is the man who possesses them only, therefore to be considered a poet. To Pope they were doubtless temptations too strong to be resisted. He who could write so well in the fashion was not likely to sacrifice fame by writing better against the fashion.

One important poem remains unnoticed, 'The Dunciad;' in which we may trace Pope's chief excellencies, and the subject being one to which his manner is peculiarly adapted, the poem on the whole appears to be the most perfect of his compositions. In 'The Dunciad' too we may discover Pope's true merit—that of having been the first to wage successful war against that crowd of verbal critics and worthless rhymsters which overran literature. The manner in which he holds up to ridicule the poets, booksellers, and critics of the time is admirable, and the number of lines of 'The Dunciad' which are in constant use as quotations, are the best proof how stinging the satire must be. Theobald was the first hero of 'The Dunciad,' and owed his exaltation to having attacked with success the mistakes in Pope's edition of Shakspere. He was succeeded in a subsequent issue by Colley Cibber, who stands as such in the present poem.

An excellent parallel has been drawn by Dr. Johnson between Dryden and Pope. It is perhaps too favourable to the latter, but shows a clear insight into the merits and faults of both. We cannot speak so favourably of the defence of Pope's 'Iliad.' To imply, as Dr. Johnson does, that the advance of civilization required the addition of Ovidian graces in a translation, shows an ignorance of the true principles of the art. Indeed it is hard to point out a good work of the kind from the time of Dryden downwards, with the exception of Dryden's Virgil, until we come to Coleridge, Cary, and the other successful translators of our own day, Dr. Johnson's own translations of Juvenal and Pope's of Horace only excepted. It thus appears that the Latin was the only tongue which met with successful translators from Dryden to Coleridge; Dryden's own style, and the character of the times, having joined to give all verse a Virgilian or Ovidian character.*

It only remains to state that as a prose writer Pope is considered to have attained considerable merit. His style is elegant and cautious, much more correct and much less attractive than Dryden's. Pope's Works, with his last corrections, and notes and a commentary by Warburton, were published in 1751 and 1760, London, 9 vols. 8vo. There is a modern edition by Roscoe, London, 10 vols. 8vo.

(Johnson's *Lives of the Poets*; Wordsworth's *Supplement to the Preface to his Poems.*)

POPE (*Papa*, in Latin) is the title assumed by the bishop of Rome as head of the Roman Catholic Church. The word papa, or papas, meaning 'father,' is used by the Greeks to denote a presbyter. In the early ages of the church it was given to the bishops in general. (Ducange, *Glossarium;* Moreri, *Dictionnaire Historique.*) Gregory VII., in a council held at Rome, A.D. 1076, decreed that the title Papa should be given only to the bishop of Rome, as a mark of superior respect.

There are three offices or dignities united in the person of the Roman pontiff. He is—1, the primate or head of the Roman Catholic world; 2, he is bishop of Rome and metropolitan of its province; 3, he is the temporal sovereign of the Papal State. His authority and the manner of his administration in the last-mentioned capacity are described under PAPAL STATE.

Considered as pontiff and primate of the Roman Catholic church, the pope has a very extensive spiritual authority over the members, both clerical and lay, of that communion. The limits of this authority are however variously defined even by Roman Catholic theologians. We cannot do better than quote on this subject the definition given in a work of considerable repute and written with great discrimination, which is entitled 'Bibliothèque Sacrée, ou Dictionnaire Universel, Historique, Dogmatique, Canonique, Géographique, et Chronologique des Sciences Ecclésiastiques, par les Révérends Pères Richard et Giraud, Dominicains; réimprimé avec additions et corrections par une Société d'Ecclesiastiques,' 20 vols. 8vo., Paris, 1822. Under the head 'Pape,' section iii., *De la Puissance et Authorité du Pape*, we read as follows:—1. 'All Catholics acknowledge that the pope holds by divine right a primacy of honour, of precedence, and of authority and canonical jurisdiction in the whole church, because he is the successor of St. Peter, to whom Jesus Christ granted those privileges. (*Matthew*, x. 2, and xvi. 17-19.) But is the pope infallible in his decisions concerning law or discipline? Is he above the general council? Has he any power, direct or indirect, over sovereigns and kingdoms? Divines are very much divided in opinion upon these questions.'

2. 'We may consider the pope either as a private and individual doctor of the law, or as the sovereign pontiff speaking "ex cathedrâ" in his quality of head of the universal church, to which church he proposes something to be believed as an article of divine faith, under pain of heresy, and this he does after having prayed, having consulted the sacred college of cardinals, and employed the other customary means in order to ascertain the truth. Now the French theologians in general, agreeably to the fourth proposition of the Gallican church, maintain, that even in this case, when he speaks "ex cathedrâ," the pope is not infallible, and that his decisions become infallible only after they have been accepted by the church, either in council assembled or dispersed in its various congregations throughout the world The Italian divines, on the contrary, commonly assert that the pope is infallible when he speaks "ex cathedrâ," independently of the consent of the church. They ground their assertion on the passage in St. Matthew, "Tu es Petrus," &c. "How," say they, "can the church be infallible, if the foundation upon which it is built be not infallible? Does the church rest upon Peter, or Peter upon the church?" To this their opponents reply—1, that the rock upon which the church is built means faith, and not the person of Peter; 2, that the promise of infallibility was made to the whole church, and not to Peter individually; 3, that all the passages which are quoted from the Scriptures or the fathers in favour of the infallibility of the pope apply not to the individual who is seated on the chair of St. Peter, but to the

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* See the Poem itself, iv. 333.

* See the preface to Hoole's 'Tasso' for the contempt in which old translations were held.

chair itself, to the see of Rome, the Roman church, the whole succession of the Roman pontiffs, the universal church in short.' The writer of the 'Bibliothèque Sacrée' winds up these conflicting statements by saying, 'This question is not one of faith.' To this remark however some will object, that the question is considered as one of faith at Rome, for as the Roman (or, as the French call them, the ultramontane) canonists assert the infallibility of the pope by divine right, it follows that they consider the belief in that infallibility, and in all the decisions emanating from it, as matters of faith; and as long as this controversy remains unsettled, a door is always open to schism, as it happened in the council of Basle, and the alleged unity of the Roman Catholic church is only nominal and precarious.

3. 'The same theologians who assert the infallibility of the pope, assert also his superiority above the general councils, and that he has the right of dissolving them, transferring them to a different place, of approving or condemning, reforming or abrogating their decisions. Those divines, on the contrary, who maintain that the pope is not infallible, maintain also that he is subject to the general councils both as to faith and discipline. This is the opinion of the French clergy, embodied in the second of the four propositions of the Gallican church, promulgated in 1682, which 'approves the decision of the council of Constance, declaring the councils general to be superior to the pope in spiritual matters.' The assertors of this proposition say that 'the pope is the head of the faithful nearly in the same manner as the general of a monastic order is the head of all the members of that order, to whom however he is subject when they are assembled in a general chapter.' It may be observed here, that besides the council of Constance, which decided this question of the superiority of the general councils over the pope, there is the council of Basle, which asserted the same principle, and that the council of Basle is reckoned by the French theologians among the legitimate councils of the church, but is not so reckoned by the canonists of Rome. [PRAGMATIC SANCTION.]

4. 'There are some writers who pretend that the pope has by divine right a direct power, both spiritual and temporal, over the whole world. Others maintain that he has at least an indirect power in temporal matters, inasmuch as he can dispose of kingdoms and crowns, and transfer them from one prince to another whenever that is required for the welfare of souls. Lastly, other divines are of opinion that neither the pope nor the church has any power, direct or indirect, in the temporal matters of kingdoms and states, that they cannot in any case depose kings, nor release their subjects from their oath of allegiance. In support of their argument, these divines show that Jesus Christ made open profession of poverty, that he solemnly declared that his kingdom was not of this world, and they allege other passages as equally decisive; and they say that the Saviour bequeathed to the church a purely spiritual authority, to be exercised in preaching, baptising, instructing, and loosening or binding sinners. The early fathers have said that the church has only the spiritual sword to keep its children within the path of duty. The most celebrated universities of Germany, France, and Spain have confirmed this opinion, which is that of the Gallican church and of Bossuet himself. The contrary opinion, namely, that the popes have a temporal jurisdiction over kings and principalities, is not of older date than the time of Gregory VII.'

Such are the statements of orthodox Roman Catholics in a work which condemns all heretics and Jansenism, for the Jansenists assert that the pope has no authority over the bishops, but only a superiority of rank; that all the bishops are vicars of Christ, and that the pope is the first among them, and that his jurisdiction is not to confer episcopacy, but only to watch over the conduct of the other bishops, &c. These opinions of the Jansenists are found, among other works, in the 'Acts of the Synod of Pistoia held by De Ricci' (*Atti e Decreti del Concilio Diocesano di Pistoia dell' anno* 1786), which were condemned by Pope Pius VI. As for the Protestant and Reformed churches, they do not acknowledge any authority or jurisdiction in the pope, except over his own diocese as bishop Rome, or at most over the other dioceses of the province of Rome as metropolitan. The Greek, Armenian, Jacobite, and Nestorian churches likewise disclaim his authority. Several Roman Catholic writers have endeavoured to trace the growth of the supremacy of the Roman see over the churches of the West, which supremacy they assert was once limited to the provinces which constituted, under the Christian emperors, successors of Constantine, the vicariate of Rome, namely, Etruria, the March of Ancona, Valeria, Apulia, Calabria, Lucania, the Abruzzi, Sicily, Sardinia, and Corsica. These provinces were under the lay jurisdiction of an imperial vicar. The rest of Italy, with Rhætia, constituted the vicariate of Italy, of which Milan was the capital. Both vicariates were subject to the prefect of Italy, who had also under his authority the provinces of Africa and Illyria. The provinces which formed part of the vicariate of Rome were called 'suburbicariæ,' and their diocesans acknowledged the bishop of Rome as their metropolitan. Such is the opinion of Father Sirmond, and of Du Pin, in his 'De antiquâ Ecclesiæ Disciplinâ,' and of Giannone, in his 'Storia civile del Regno di Napoli.' They contend that until the reign of Valentinian III. the metropolitan authority of the bishop of Rome did not extend beyond the suburbicarian provinces. Allatius, Baronius, Maimbourg, and others, on the contrary, contend that the bishop of Rome was by right the metropolitan of the whole West, if not of the whole Roman empire. Gregory I. (the Great) however disclaimed the title of Œcumenic or universal bishop, and in token of humility assumed that of 'Servus Servorum Domini,' the 'Servant of the Servants of the Lord,' which his successors have continued to place at the head of their briefs and decretals.

In his quality of bishop of Rome, the pope delegates his authority as ordinary to a prelate called Vice-Gerente, who is generally a bishop in partibus. In his quality of metropolitan of the province of Rome, he has under him the bishops called Suburbicarii of Ostia and Velletri, of Porto and Santa Rufina, of Sabina, of Frascati, of Albano, and of Palestrina. As primate of the Roman Catholic church, he has under him the following sees:—In the Papal State, 8 archbishops and 59 bishops; in Tuscany, 3 archbishops and 17 bishops; in the kingdom of the Two Sicilies, 23 archbishops and 73 bishops; in the Sardinian monarchy, 7 archbishops and 34 bishops; in the duchy of Parma, 4 bishops; in the duchy of Modena, 4 bishops; in the duchy of Lucca, 1 archbishop; in the Austrian empire, 13 archbishops and 71 bishops; in the rest of Germany, 5 archbishops and 20 bishops; in Switzerland, 4 bishops; in Belgium, 1 archbishop and 5 bishops; in France, 14 archbishops and 66 bishops; in Spain, 8 archbishops and 49 bishops; in Portugal, 3 archbishops and 14 bishops; in Russian Poland, 5 archbishops and 13 bishops, of whom 2 archbishops and 3 bishops belong to the united Greek church; in Ireland, 4 archbishops and 23 bishops; in the states of Spanish America, 6 archbishops and 35 bishops; in Brazil, 1 archbishop and 10 bishops; in the Spanish colonies, 1 archbishop and 7 bishops; in the Portuguese colonies, 2 archbishops and 10 bishops; in Hayti, 1 bishop; in the French settlement of Algiers, 1 bishop, lately appointed; in Canada, 2 bishops; in the other English colonies and dependencies, 2 archbishops and 2 bishops; in the United States, 1 archbishop and 11 bishops. (Serristori, *Statistica d'Italia.*) There are besides several bishops in partibus infidelium in Turkey, China, Barbary, &c. In England and other Protestant countries the vicars apostolic exercise the episcopal functions over that part of the community which follows the Roman Catholic faith. The total number of people who profess the Roman Catholic religion in Europe is roughly calculated at about 112 millions, or about one half of the population of Europe. The countries of which the population is exclusively Roman Catholic are,—1, Italy; 2, Spain; 3, Portugal; 4, the kingdom of Belgium. In America, the Spanish and Portuguese states are also exclusively Catholic. Roman Catholic congregations are scattered about various countries of Asia, but in small numbers.

For the manner in which the pope carries on the spiritual government of this extensive flock see CATHOLIC CHURCH and CONCORDAT. The form of election of the pope is given under CONCLAVE. For the history of the popes see their respective names, ADRIAN, ALEXANDER, BENEDICT, BONIFACE, CALIXTUS, CLEMENT, EUGENIUS, FELIX, GREGORY, HONORIUS, INNOCENT, JOHN, JULIUS, LEO, MARTIN, NICHOLAS, PASCHAL, PAUL, PIUS, SERGIUS, SIXTUS, STEPHEN, URBAN, &c. The reader may refer also to the *Vitæ et Res Gestæ Pontificum Romanorum ab Initio nascentis Ecclesiæ usque ad Urbanum VII.*, by Ciaconio, Cabrera, and Vittorello, fol., Rome, 1630.

The chronology of the earlier popes is often obscure, and the dates are uncertain. The following table is chiefly founded on Petau's 'Rationarium Temporum.' According to the chronology of the Roman Church, the apostle St. Peter was the first bishop of Rome, and suffered martyrdom, A.D. 57. He is said to have entrusted in his lifetime the see of Rome to Linus, a native of Etruria, who died in the year 68. Linus was succeeded by Clemens Romanus, who died about A.D. 100. Some chronologists place Anacletus or Cletus between Linus and Clemens, whilst others place him after Clemens. [CLEMENT I.] Evaristus, a native of Palestine, is recorded as bishop of Rome about the year 100, and was succeeded by Alexander I. about 109. Alexander I. was succeeded by Sixtus I., a Roman, in 119. Sixtus was succeeded, in 127, by Telesphorus, a Greek, who is said by Irenæus to have suffered martyrdom about the year 138. Hyginus, a native of Athens, succeeded Telesphorus, and was succeeded, in 142, by Pius I., a native of Aquileia. Pius was succeeded, in 151, by Anicetus, a native of Syria. Anicetus was succeeded, in 161, by Soterus, who was succeeded, in 170, by Eleutherus, in whose time Irenæus visited Rome. Eleutherus was succeeded, in 185, by Victor I., a native of Africa. To Victor succeeded Zephyrinus, A.D. 197. Zephyrinus was succeeded, in 217, by Kallistus or Calixtus I., who governed the see of Rome through a period of comparative tranquillity under the tolerant reign of Alexander Severus. Calixtus was succeeded, in 222, by Urban I. Pontianus succeeded Urban in 230, and died in exile. He was succeeded, in 235, by Antherus, who a few months after his election suffered martyrdom, during the persecution of the Christians by Maximinus. He was succeeded by Fabianus, A.D. 236. Fabianus was succeeded, in 252, by Cornelius, whose election was contested by Novatianus, a Roman presbyter, who is the first antipope recorded in history. Cornelius was succeeded, in 253, by Lucius I. To Lucius succeeded Stephen I., in the same year. Stephen had a warm controversy with Cyprian, bishop of Carthage. Stephen was succeeded by Sixtus II., in 257. Sixtus was succeeded by Dionysius, A.D. 259. It was under Dionysius that the heresy of Paul of Samosata broke out. Dionysius was succeeded by Felix I. in the year 270. Eutychianus succeeded Felix in 275, and was suceeded, in 283, by Caius, who is said to have been a relative of the emperor Diocletianus. Caius was succeeded, in 296, by Marcellinus. Marcellinus died A.D. 305, and after a vacancy of three years Marcellus was elected in 308. Eusebius succeeded Marcellus in 310, who was succeeded in the same year by Melchiades, in whose time Constantine defeated Maxentius and took possession of Rome. Melchiades was succeeded, in 314, by Sylvester I., during whose pontificate Constantine convoked the great council of Nicæa, to which Sylvester sent two priests as his legates. In that council it was decreed that the bishop of Rome should be primate over the churches of those provinces which in civil matters were subject to the jurisdiction of the 'Vicarius Urbis,' or imperial vicar of Rome.

Date of election.
A.D.
336. Marcus, a native of Rome, succeeded Sylvester I.
337. Julius I., a native of Rome.
352. Liberius, a Roman, banished by Constantius.
   Felix, substituted by Constantius, is considered by most as an intruder.
366. Damasus I., a Spaniard, elected after the death of Liberius.
   Ursicinus, antipope against Damasus.
384. Siricius, a Roman, succeeded Damasus.
398. Anastasius I., a Roman.
401. Innocent I., native of Albano.
417. Zosimus, a Greek.
418. Boniface I., a Roman.
422. Celestinus I., a Roman.
432. Sixtus III., a Roman.
440. Leo I. of Rome, called the Great.
461. Hilarius, a native of Sardinia.
467. Simplicius, a native of Tibur.
483. Felix III. of Rome.
492. Gelasius I. of Rome.
496. Anastasius II. of Rome.
498. Symmachus, a native of Sardinia.
514. Hormisdas, a native of Frusino.
523. John I., a Tuscan
526. Felix IV., a native of Beneventum.
530. Boniface II. of Rome.
532. John II. of Rome.

A.D.
535. Agapetus I. of Rome.
536. Sylverius, a native of Campania.
540. Vigilius, a Roman.
555. Pelagius I., a Roman.
560. John III. of Rome.
574. Benedict I. of Rome.
578. Pelagius II. of Rome.
590. Gregory I. of Rome, styled the Great.
604. Sabinianus, a native of Tuscany.
607. Boniface III. of Rome.
608. Boniface IV., a native of Abruzzo
615. Deusdedit or Deodatus I. of Rome.
619. Boniface V., a Neapolitan.
625. Honorius I., a native of Capua.
638. Severinus of Rome.
640. John IV., a native of Dalmatia.
641. Theodorus, a Greek.
649. Martin I. of Tudertum.
654. Eugenius I. of Rome.
657. Vitalianus, a native of Signia.
672. Deusdedit II. of Rome.
676. Domnus I. of Rome.
678. Agathon, a Sicilian.
682. Leo II., a Sicilian.
684. Benedict II. of Rome.
685. John V., a native of Syria.
686. Conon, a native of Thrace.
687. Sergius I., a native of Palermo.
701. John VI., a native of Greece.
705. John VII., a native of Greece.
708. Sisinius, a native of Syria, died a month after.
708. Constantine, a Syrian.
715. Gregory II. of Rome.
731. Gregory III., a Syrian.
741. Zacharias, a Greek, crowned Pepin, king of France.
753. Stephen II. survived his election only a few days.
753. Stephen III. of Rome.
757. Paul I., a Roman.
763. Stephen IV., a Sicilian.
772. Adrian I., a Roman.
795. Leo III., a Roman, crowned Charlemagne emperor, A.D. 800.
816. Stephen V., a Roman.
817. Paschal I., a Roman.
824. Eugenius II., a Roman.
827. Valentinus, a Roman, died in less than two months after.
827. Gregory IV., a Roman.
843. Sergius II., a Roman.
847. Leo IV., a Roman.
   Between Leo and his successor some chroniclers place JOAN.
855. Benedict III., a Roman.
858. Nicholas I., a Roman. Schism of PHOTIUS began.
867. Adrian II., a Roman.
872. John VIII., a Roman.
882. Martin II., called by some Marinus I.
884. Adrian III., a Roman.
885. Stephen VI., a Roman.
891. Formosus, bishop of Porto.
   Sergius, antipope, and after him Boniface, styled by some VI.
896. Stephen VII., a Roman.
897. Romanus, a Tuscan, died after four months.
897. Theodorus II., a Roman, died in less than a month.
897. John IX. of Tibur.
900. Benedict IV., a Roman.
903. Leo V., a native of Ardea.
   Christopher, antipope.
904. Sergius III., the favourite of Marozia and the Tuscan faction.
911. Anastasius III., a Roman.
913. Lando, a native of Sabina.
914. John X., a Roman, died in prison by the Tuscan faction.
928. Leo VI., a Roman.
929. Stephen VIII., a Roman.
931. John XI., son of Sergius III. and of Marozia.
936. Leo VII., a Roman.
939. Stephen IX., a Roman.
943. Martin III., called by some Marinus II.
946. Agapetus II.
956. John XII., Ottaviano Conti, nephew of John XI

A.D.

He was the first who changed his name on his assumption.
963. Leo VIII., styled antipope by some
964. Benedict V., a Roman.
965. John XIII., a Roman.
972. Benedict VI., was killed in the tumult of Crescentius.
973. Domnus II., a Roman.
974. Benedict VII., of the Conti family.
983. John XIV., put to death by Cardinal Franco.
Franco, antipope, by the name of Boniface VIII
985. John XV., a Roman, died in a few months.
986. John XVI., a Roman.
996. Gregory V., a German: Crescentius put to death by Otho III.
999. Sylvester II., Gerbert, native of Auvergne.
1003. John XVIII., a Roman.
1009. Sergius IV., a Roman.
1012. Benedict VIII. of Tusculum, of the Conti family.
1024. John XIX. of Rome, brother of the preceding.
1033. Benedict IX., nephew of the preceding, deposed.
Antipope, Sylvester, bishop of Sabina.
1044. Gregory VI. of Rome, abdicated.
1047. Clement II. of Saxony (bishop of Bamberg).
1048. Damasus II. (Poppo, bishop of Brixen).
1049. Leo IX., bishop of Toul. Final separation of the Greek church.
1055. Victor II., bishop of Eichstadt.
1057. Stephen IX. Frederick, abbot of Monte Casino
1058. Benedict X., by some styled antipope, abdicated.
1059. Nicholas II. of Burgundy.
1061. Alexander II. of Milan.
1073. Gregory VII., Hildebrand, a monk of Soana in Tuscany.
Guibert, antipope, assumed the name of Clement III.
1086. Victor III., a native of Beneventum.
1088. Urban II., a native of France.
1099. Paschal II., a native of Tuscany.
Antipopes, Albert and Theodoric.
1118. Gelasius II., a native of Caieta.
1119. Calixtus II., a native of Burgundy.
1124. Honorius II., Cardinal Lamberto, bishop of Ostia.
1130. Innocent II., a Roman.
Anacletus, antipope.
1143. Celestinus II., a Tuscan.
1144. Lucius II. of Bologna.
1145. Eugenius III. of Pisa.
1153. Anastasius IV., a Roman.
1154. Adrian IV., Nicholas Breakspeare, an Englishman.
1159. Alexander III. Cardinal Orlando Bandinelli of Siena.
Cardinal Octavian, antipope, by the name of Victor.
Cardinal Guido, antipope, by the name of Paschal.
Calixtus, antipope.
1181. Lucius II., Cardinal Ubaldo of Lucca.
1185. Urban III., Uberto Crivelli, archbishop of Milan.
1187. Gregory VIII. of Beneventum, died in two months.
1188. Clement III., Paul, bishop of Præneste.
1191. Celestinus III., Cardinal Hyacinthus, a Roman.
1198. Innocent III., Cardinal Lotharius of Signia.
1216. Honorius III., Cardinal Savelli of Rome.
1227. Gregory IX., Cardinal Hugo of Anagni.
1241. Celestinus IV. of Milan, died in a few days.
1242. Innocent IV., Cardinal Sinibaldo Fieschi of Genoa.
1254. Alexander IV., Cardinal Rinaldo Conti of Anaqui.
1261. Urban IV., James, patriarch of Jerusalem, a Frenchman.
1265. Clement IV., Guy of St. Gilles in Languedoc.
1272. Gregory X., Tebaldo Visconti of Piacenza.
1276. Innocent V., Cardinal Peter, a native of Tarentaise.
1276. Adrian V., Ottobono Fieschi of Genoa, died in a month.
1276. John XXI. of Lisbon.
1277. Nicholas III., Cardinal Orsini of Rome.
1281. Martin IV., Cardinal Simon de Brie, a Frenchman.
1285. Honorius IV., Cardinal James Savelli of Rome.
1288. Nicholas IV., Cardinal Jerome of Ascoli.
1294. Celestinus V., Pietro da Morrone of Abruzzo, abdicated.
1295. Boniface VIII., Cardinal Benedetto Caetani of Anagni.
1303. Benedict XI., Cardinal Nicholas of Treviso.
1305. Clement V., Bertrand of Bordeaux, removed the Papal See to Avignon.
1316. John XXII., James of Cahors in France.

A.D.

Nicholas, antipope, in Italy.
1334. Benedict XII., James Fournier, a Frenchman.
1342. Clement VI., Peter Roger of Limoges in France.
1352. Innocent VI., Stephen Aubert of Limoges.
1362. Urban V., William Grimoard, a Frenchman.
1370. Gregory XI., Peter Roger, a Frenchman, restored the Papal See to Rome.
1378. Urban VI., Bartolomeo Prignano, a Neapolitan.
Antipope, Clement, at Avignon.
1389. Boniface IX., Peter Tomacelli of Naples.
Antipope, Pedro de Luna, a Spaniard. [BENEDICT, ANTIPOPE.]
1404. Innocent VII., Cosmo Migliorati of Sulmona.
1406. Gregory XII., Angelo Corrari of Venice, abdicated at Constance.
1409. Alexander V., Peter Philargius of Candia.
1410. John XXIII., Cardinal Cossa, deposed by the Council of Constance.
1417. Martin V., Otho Colonna, a Roman.
1431. Eugenius IV., Gabriel Condulmero, a Venetian
Schism between the Pope and the Council of Basle.
Felix, antipope. [AMADEUS VIII.]
1447. Nicholas V., Cardinal Thomas of Sarzana
1455. Calixtus III., Alfonso Borgia, a Spaniard.
1458. Pius II., Æneas Sylvius Piccolomini of Siena
1464. Paul II., Peter Barbo of Venice.
1471. Sixtus IV., Francis della Rovere, a Genoese
1485. Innocent VIII., Gian Battista Cibo, a Genoese.
1492. Alexander VI., Rodrigo Lenzoli Borgia, a Spaniard.
1503. Pius III., Francis Todeschini Piccolomini, died in a month.
1503. Julius II., Julian della Rovere, a Genoese.
1513. Leo X., Giovanni de' Medici, son of Lorenzo the Magnificent.
1522. Adrian VI. of Utrecht, preceptor of Charles V.
1523. Clement VII., Giulio de' Medici, nephew of Lorenzo.
1534. Paul III., Alessandro Farnese of Rome: convoke the Council of Trent.
1550. Julius III., Giovan Maria Giocci of Rome.
1555. Marcellus II., Cardinal Cervini of Montepulciano, died in a month.
1555. Paul IV., Gianpietro Caraffa, a Neapolitan.
1559. Pius IV., Giovanni Angelo Medichini of Milan closed Council of Trent.
1566. Pius V., Michele Ghislieri of Alessandria in Piedmont.
1572. Gregory XIII., Hugo Buoncompagni of Bologna.
1585. Sixtus V., Felice Peretti of Montalto in the March of Ancona.
1590. Urban VII., Gian Battista Castagna, a Genoese, died in a few days.
1590. Gregory XIV., Nicola Sfrondati of Milan.
1591. Innocent IX., Gian Antonio Facchinetti of Bologna.
1592. Clement VIII., Ippolito Aldobrandini, a native of Fano.
1605. Leo XI., Alessandro de' Medici of Florence, died in a month.
1605. Paul V., Camillo Borghese of Rome.
1621. Gregory XV., Alessandro Ludovici of Bologna.
1623. Urban VIII., Maffeo Barberini, a Florentine.
1644. Innocent X., Gian Battista Pamfili of Rome.
1655. Alexander VII., Fabio Chigi of Siena.
1667. Clement IX., Giulio Rospigliosi of Pistoia.
1670. Clement X., Emilio Altieri of Rome.
1676. Clement XI., Benedetto Odescalchi of Como.
1689. Alexander VIII., Pietro Ottoboni of Venice.
1691. Innocent XII., Antonio Pignatelli of Naples.
1700. Clement XI., Gian Francesco Albani of Urbino.
1721. Innocent XIII., Michel Angelo Conti of Rome.
1724. Benedict XIII., Vincenzo Maria Orsini of Rome.
1730. Clement XII., Lorenzo Corsini of Florence.
1740. Benedict XIV., Prospero Lambertini of Bologna.
1758. Clement XIII., Carlo Rezzonico of Venice.
1769. Clement XIV., Gian Vincenzo Ganganelli, born near Rimini.
1775. Pius VI., Angelo Braschi of Cesena.
1800. Pius VII., Gregorio Barnaba Chiaramonti of Cesena.
1823. Leo XII., Annibale della Genga, native of Romagna.
1829. Pius VIII., Cardinal Castiglioni of Cingoli.
1831. Gregory XVI., Mauro Capellari, born at Belluno.

POPERY is a word often used in England in an invidious sense to denote the Roman Catholic religion in general, but more particularly those tenets of the Roman church which are most obnoxious to those who dissent from it, such as its avowed exclusiveness, its intolerance, which is founded on the belief that out of its pale there can be no salvation, and its consequent authoritative tone and determined proselytism. For a zealous Catholic there can be no truce with what he considers to be error, and his duty is to reclaim as many as he can to the bosom of his church.

In an encyclic letter of the present pope, dated 15th August, 1832, and addressed to all patriarchs, archbishops, and bishops, the principle of allowing liberty of conscience to the people is censured as 'absurd, erroneous, and delirious, derived from the corrupt source of indifferentism. For the liberty of error is death to the soul.' It was in compliance with this declaration that La Mennais in the following September dissolved the society which he had established 'for advocating religious liberty.' (*Affaires de Rome*, par M. F. de la Mennais, Bruxelles and London, 1836, with copy of the 'Encyclic Letter,' and other documents.)

POPERINGEN is a flourishing town in the province of West Flanders, in the kingdom of Belgium, twenty-six miles south by west of Ostend, situated on a canal called the Schipvaert, and has 10,000 inhabitants. The churches, of which there are seven, viz. two parish churches and five belonging to the convents, are well-built edifices. The inhabitants have considerable manufactures of coarse woollens and serge, several oil-mills, and carry on a profitable trade, especially in hops, which are very extensively cultivated in the neighbouring country, and are of very superior quality, being preferred even to those of Alost. (Stein; Hassel.)

POPPY. [PAPAVER.]

POPULATION, the number of people in any country or division of a country, or in a city or town.

The circumstances which determine the proportion of the population to the area of any given country, are the first elements which we must take into the account in considering their social condition. In the lowest stage of human existence, that in which men depend on hunting and fishing for a subsistence, they are scattered over an immense surface in order to obtain food; and as the animals which they pursue become scarce in one part, they remove to another. Though the numbers of a tribe may not average one individual to a square mile, the difficulties of procuring subsistence are often so great, that frequent hunger and occasional famines have always characterised the savage state. Many of the tribes of North America which live near and among the Rocky Mountains are actual examples of this precarious mode of existence; and the white men who hunt the fur-bearing animals in the same regions are subjected to these inconveniences of a savage life. The purely pastoral state admits of a greater relative proportion of population; but the necessity of frequent removal from place to place in search of pasture does not admit of this proportion surpassing a certain limit, which is determined by the capabilities of the uncultivated land to feed their flocks and herds. If agriculture be resorted to, and the occupation of the shepherd be exchanged for that of the husbandman, the tract over which the former wandered with their flocks will sustain a much larger population. In the early stages of agriculture, the implements of labour are few and imperfect; the clothing of each family is the produce of household industry; and only a limited number of non-agriculturalists is needed to satisfy the demands of the community. When a more minute division of employments takes place; and the husbandman is solely engaged in raising food, while others are employed in making clothing and supplying all the other wants of the population, the labour of the community becomes much more productive, and food being consequently raised in greater quantities, this change is followed by an increase of the population; and when machines for abridging human labour are introduced, a further stimulus is given to the increase of population. An intelligent, healthy, and industrious population, who possess a good soil and abundance of mineral wealth, are enabled by improvements in machinery and labour-saving contrivances, not only to supply their own wants, but those of other countries in a less advanced state. When a country has succeeded in introducing the products of an extensively diversified industry into the markets of the world, and thus enjoys a far larger amount of commerce than it could command if its foreign trade were determined by the mere extent of its territory, instead of the industry, enterprise, and intelligence of its inhabitants operating on its natural resources, the population may be increased almost indefinitely, with a continual increase in the comforts which it enjoys. In the savage state, a tract of several hundred square miles is overstocked by as many individuals: in nations which have reached the highest degree of civilization hitherto known, the population is as great to one single square mile.

Under all the diversity of circumstances in which the inhabitants of different parts of the world exist, their numbers are limited by the means of subsistence. If the population increases faster than the food for their support, poverty and misery ensue, and death thins their numbers, and brings them to a level with the means of subsistence. This effect may take place whether the population be one to a square mile or several hundreds. Hence the proportion of births, marriages, and deaths to the population, is as important an element in ascertaining the physical condition of the population of any country as the proportion of their numbers to each square mile.

The evils which arise when the population increases more rapidly than the means of subsistence had not escaped the notice of two of the most eminent writers of antiquity Plato and Aristotle. (Plato, *Laws*, v., and *Republic*, v.; Aristotle, *Politik*, vii. 16.) In later times, this truth had been seen by Dr. Franklin, Sir James Stewart (*Treatise on Pol. Econ.*, book 1), Mr. Townsend (*Essay on the Poor-Laws*), and other English and French economists. Their views attracted little attention at the time when they wrote. In England especially, during the eighteenth century, a false opinion prevailed that the population was diminishing; and subsequently the demand for men during the long war with France rendered the evils of a redundant population almost imaginary in general estimation. The decennial census of the population during the present century, the transition from war to peace, and the commercial embarrassments and periods of public distress which have been experienced, have contributed to enlighten the public mind; and the writings of the late Mr. Malthus have powerfully aided in producing correct views upon the questions of population. His 'Essay on the Principle of Population' was first published anonymously in 1798. This work was suggested by a paper in Godwin's 'Inquirer,' and the author's object was to apply the principle of population in considering the schemes of human perfectibility, and other speculations on society to which the French revolution had given birth. Hume (*Populousness of Ancient Nations*), Wallace (*Dissertation on the Numbers of Mankind in Antient and Modern Times*), and Dr. Price's writings of more recent date, were the authors from whom Mr. Malthus deduced the main principle of his Essay. In 1803 appeared a second edition, to which Mr. Malthus affixed his name, and which might almost be considered as a new work. The author had in the interval directed his attention to an historical examination of the effect of the principle of population on the past and present state of society, and the subject was for the first time treated in a comprehensive and systematic manner. A third and fourth edition appeared a few years afterwards. The fifth edition, containing several additional chapters, was published in 1817. The sixth and present edition, which contained few alterations, was published in 1826. The title of the work as it at present stands is as follows:—'An Essay on the Principle of Population, or a view of its past and present Effects on Human Happiness, with an Inquiry into our prospects respecting the future removal or mitigation of the evils which it occasions.' The following is a brief summary of its leading principles.—Mr. Malthus's propositions are—that population, when unchecked, goes on doubling itself every twenty-five years, or increases in a geometrical ratio; while the means of subsistence, under the most favourable circumstances, could not be made to increase faster than in an arithmetical ratio. That is, the human species may increase as the numbers 1, 2, 4, 8, 16, 32; while the increase of food would only proceed in the following ratio, 1, 2, 3, 4, 5, 6. Thus if all the fertile land of a country is occupied, the yearly increase of produce must depend upon improved means of cultivation; and neither science nor capital applied to land could create an increased amount of produce beyond a certain limit. But the increase of population would ever go on with unabated vigour, if food could be obtained, and a population of twenty millions would possess as much the inherent power of doubling itself as a population of twenty thousand. Population however cannot increase beyond the lowest nourishment capable of supporting life; and therefore the difficulty of obtaining food forms the primary check on the increase of population, although it does not usually present itself as the immediate check, but operates upon mankind in the various forms of misery or the fear of misery. The immediate check may be either *preventive* or *positive;* the former being such as reason and reflection impose, and the latter consisting of every form by which vice and misery shorten human life. Thus a man may restrain the dictates of nature which direct him to an early attachment for one woman, from the fear of being unable to preserve his children from poverty, or of not having it in his power to bestow upon them the same advantages of education which he had himself enjoyed. Such a restraint may be practised for a temporary period or through life, and though it is a deduction from the sum of human happiness, the evil is not to be compared in extent with that which results from the positive checks to population, namely, unwholesome occupations, severe labour, and exposure to the seasons, extreme poverty, bad nursing of children, excesses of all kinds, the whole train of common diseases and epidemics, wars, plagues, and famines.

The preventive and the positive checks which form the obstacles to the increase of population are resolvable into, 1, moral restraint; 2, vice; and 3, misery. *Moral restraint* (considered as one of the checks to population for the first time in the second edition, 1803) is the prudential restraint from marriage, with a conduct strictly moral during the period of this restraint. Promiscuous intercourse, unnatural passions, violation of the marriage bed, and improper arts to conceal the consequences of irregular connections, are included under the head of *Vice.* Those positive checks which appear to arise unavoidably from the laws of nature may be called exclusively *Misery.* Such are the checks which repress the superior power of population, and keep it on a level with the means of subsistence.

The 'Essay on Population,' as the following analysis of its contents will show, places the question in every light which can elucidate the truth. It is divided into four books, the first of which notices the checks to population in the less civilised parts of the world and in past times. The second book passes in review the different states of modern Europe (most of which Mr. Malthus visited in the interval preceding the publication of the second edition), and he points out the checks to population which prevail in each. Chapter xi. of this book is 'On the Fruitfulness of Marriages;' chapter xii. 'On the Effects of Epidemics on Registers of Births, Deaths, and Marriages; and chapter xiii. is devoted to 'General Deductions from the preceding view of Society.' The third book comprehends an examination of the different systems or expedients which have been proposed or have prevailed in society, as they affect the evils arising from the principle of population; in the first three chapters, the systems of equality proposed by Wallace, Condorcet, Godwin, &c. are considered. Several chapters are devoted to the consideration of poor-laws; corn-laws (first in connection with bounties on exportation, and secondly under restrictions on importation); the agricultural system; the commercial system; and the combination of both. The last two chapters are, 'Of increasing Wealth as it affects the Condition of the Poor;' and a summary containing 'General Observations.' The fourth book treats of 'Our Future Prospects respecting the Removal or Mitigation of the Evils arising from the Principle of Population.' Chapter i. treats 'Of Moral Restraint and our Obligations to practise this Virtue.' Chapter ii. is 'Of the Effects which would result to Society from the prevalence of Moral Restraint.' Chapter iii. is 'Of the only effectual Mode of Improving the Condition of the Poor.' And the last chapter is 'Of our rational Expectations respecting the Future Improvement of Society.'

Perhaps no author has been more exposed to vulgar abuse than Mr. Malthus. He was accused of hardness of heart, and represented as the enemy of the poorer classes, whereas no man was more benevolent in his views; and the earnestness with which he engaged in his work 'On Population' arose from his desire to diminish the evils of poverty to their lowest possible amount. His mind was philosophic, practical, and sagacious; his habits, manners, and tastes, simple and unassuming; his whole character gentle and placid. The last edition of his 'Principles of Political Economy' contains an interesting memoir of his life and writings by Dr. Otter, late Bishop of Chichester, who had known him intimately for half a century. A list of Mr. Malthus's works and writings is given in page 42 of this 'Memoir:' it is a matter of regret that they have never been published in a collected form. Several of the most valuable productions of his pen appeared in the Edinburgh and Quarterly Reviews. We must refer the reader to the above 'Memoir' for a further account of Mr. Malthus. He was born at Albury, near Guildford, in 1766; was a fellow of Jesus College, Cambridge, and entered holy orders: he afterwards married. In 1804 he was appointed Professor of History and Political Economy at the East India College, Haileybury, the duties of which he fulfilled to the time of his death, in December, 1834. Mr. Malthus was a Fellow of the Royal Society and member of the National Institute of France. It is not creditable to those who had the distribution of ecclesiastical patronage, that Mr. Malthus never held any preferment in the church. From this brief notice of the individual whose name is so intimately identified with the theory of population, to the elucidation of which the best part of his life was devoted, we turn to the subject of the present article.

Although circumstances may sometimes occur in which the tendency of population to outstrip the means of subsistence may be counteracted, and food may for a time increase faster than population, yet this only gives an impulse to the latter, and the former proportion is quickly re-established provided no improvement takes place either in the prudential habits of the people or in the elevation of their tastes and desires. The poverty and misery which are observable among the lower classes of the people in every country can in a great degree be accounted for by a reference to the principle of population. It is evident, for example, that the rate of wages depends, for one of its elements, on the proportion between population and means of employment, or in other words, capital; and that any alteration in either directly affects wages. If population has increased while the funds for employing labour have remained stationary, the competition of labourers will cause the rate of wages to decline. If, on the other hand, capital has increased faster than population, or capital has been concentrated on any given spot more rapidly than population, wages will rise in the former case, and in the latter will be higher than in other places where the same thing has not taken place. Thus, occasionally in some parts of the United States, so many emigrants with capital will flock to a single spot, that the wages of carpenters, tailors, and others, whose labour is in immediate demand, will become very high compared with any other place that has not been recently settled. The tendency of population to increase is the same under all circumstances, but this is not the case with capital; for in proportion to the capital already accumulated, the difficulty of adding to it becomes greater, that is, the field for the employment of capital becomes less extensive. Under such circumstances wages would have a constant tendency to fall, if the checks to population did not interpose; but it depends upon the people themselves whether the level is to be maintained by vice and misery, or by habits of prudential restraint. The latter may always be depended upon for securing to them a fair proportion of the necessaries of life.

The great problem of society is to maintain the most beneficial proportion between population and food—'to unite the two grand desiderata, a great actual population and a state of society in which squalid poverty and dependence are comparatively but little known.' Disheartening as the evils resulting from the principle of population may at first sight seem, they are capable of mitigation. This principle may even be regarded as one of the great springs of human improvement—as the parent of invention and the stimulus to exertion—which preserves society from that state of imbecility and decline into which it would fall if not urged onward by some extraordinary power. It is the interest of all members of society, and is particularly incumbent on those who have the power, to use their best exertions to elevate the habits, tastes, and moral feelings of the people; and by this means to render every successive material improvement conducive to the happiness of society. If this be not done, as much wretchedness as we find in the lower stages of society may co-exist with the highest efforts of art and science and the greatest perfection in all the processes of industry. Even the introduction of vaccination or any similar means of diminishing mortality is of little avail provided the number of marriages continues the same without any corresponding increase of the resources of society, and the average mortality will not be diminished, but disease will be fatal under other forms. Every improvement which tends to increase the quantity of human food, and every invention which enriches society by cheapening the processes for obtaining the necessaries of life should be accompanied by a corresponding advance in the intellectual and moral character of a nation, in order to secure all the advantages which these improvements are calculated to confer.

Mr. Malthus's theory is now generally accepted as the true exposition of the principle of population. Many of the objections that have been urged against it are hardly worthy of notice. Some are content to quote the Scripture command, 'Increase and multiply,' forgetful of the moral obligations which are imposed in connection with it. Others have imagined that they have discovered a supernatural law of fecundity which varies with the fluctuating circumstances of society. Dr. Price, Mr. Godwin, and Mr. Sadler entertained this notion. Mr. Malthus's reasons for not replying to Mr. Godwin's work are stated in the appendix to the sixth edition of the 'Essay on Population.' The fallacies of Mr. Sadler's work are most ably exposed in the 'Edinburgh Review,' No. 102. Mr. Senior is the only economist of any distinction who has objected to the theory of Mr. Malthus. He contends, in his 'Two Lectures on Population,' for the doctrine that 'the means of subsistence have a natural tendency to increase faster than population.' The appendix to these 'Lectures' contains a correspondence between Mr. Malthus and Mr. Senior on their respective views: it exhibits the latest views of Mr. Malthus, though, after forty years' anxious reflection on the subject, he had no change to make in his opinions. The latest work on population (published in the middle of 1840) is 'The Principles of Population, and their Connection with Human Happiness,' by Archibald Alison, Esq.

The disputes about the principle of population, like those which have arisen in many other questions of a like kind, are mainly owing to the ambiguity of language: in fact they are very little more than questions about the consistent use of words. If we analyse the proposition of Mr. Senior, it will appear that it is not easy to conceive with clearness the meaning of its terms. The words 'means of subsistence' may signify the subsistence which is obtained from spontaneous products of the earth and from the natural increase of animals. The products of the earth may be said to have a natural tendency to increase, or naturally to increase, or rather to be produced; and it may, for argument's sake, be admitted, though it is not true, that animals have the same kind of natural tendency to increase, or are in like manner naturally increased, or rather are produced. There is no other natural tendency to increase, or natural increase, or natural produce, that we can conceive, if the word 'natural' is to have its ordinary acceptation. The increase of population, or the produce of new population, may be said to be natural, exactly in the same sense in which the increase or produce of animals generally may be called natural. If then this should be the sense of the word 'natural,' the proposition means that vegetables and animals (not including man) have a natural tendency to increase faster than man, who is also an animal—a proposition which is not worth the trouble of discussion.

But this is not the meaning of the writer who maintains this proposition: he is evidently speaking of human labour and its products when he is speaking of the 'means of subsistence.' The term 'means of subsistence' therefore contains the notion of human labour; and 'means of subsistence' are the products obtained by human industry applied to material objects. Everything 'natural' therefore is by the very force of the term 'means of subsistence' excluded from these words; for it is not of natural produce simply that the writer is speaking, but of that which human labour produces: in other words, though nature (to use the vulgar term) co-operates, the thing produced is not viewed as nature's product, but as the product of human labour. There is then nothing 'natural' in 'the means of subsistence,' and therefore there is no natural tendency to increase in the means of subsistence; and consequently the comparison contained in the proposition between things that have no natural tendency to increase, and things that, in a sense, have a natural tendency, is unmeaning. Whether then the assertion be that 'there is a natural tendency in population to increase faster than capital' (Mill), or 'that the means of subsistence have a natural tendency to increase faster than population' (Senior), in either case the use of the word 'natural' is incorrect, and not only tends to cause, but does cause confusion. It should be observed that in enunciating this proposition, Mr. Senior sometimes omits the word 'natural.'

Again, the natural tendency of population to increase is simply the desire and the power to gratify the animal passion, the consequence of which is the physical union of the sexes and the production of their kind. But this tendency (to use again this very vague expression) is positively checked by want of food and other things necessary for human sustentation and health. If food and such other things could be had to an indefinite amount without any labour, so far as food and such other things only are necessary to its increase, population would go on continually increasing. But the actual conditions of obtaining food and such other things are human labour; that is, the labour of those animals, who, if supplied with all that they want without any labour, *might* go on increasing indefinitely. It appears then that this so-called natural tendency of population to increase has no *effect*, that is, it remains a tendency; that is, it is nothing at all in results, unless man labours; and the amount of his labour, in considering this question, is quite immaterial. It is unimportant whether it consists in making a plough and ploughing the earth, or plucking an apple from a tree and eating it. The whole proposition then may be developed thus:—The means of subsistence are only produced or had by man's labour: these 'means of subsistence' so produced have no natural tendency to increase, except so far as man has a natural tendency to increase. Now, man has in a sense a natural tendency to increase, that is, he has a desire and a capacity to increase, and he can increase if he has the means of subsistence. But he must have the means of subsistence first; and if the actual means of subsistence are only sufficient for the actual population, there can be no increase of the population till the means of subsistence are increased. The 'means of subsistence,' at any given time and in any given nation, signify those things which the individuals of that nation require according to their several stations and the habits of society: they may be the bare means of sustaining life; or they may be those things also which Mr. Senior has well defined under the heads of 'decencies' and 'luxuries.' If, while the means of subsistence remain the same, the population lower their scale of living, it may increase further, for the relative means of subsistence are by the supposition increased. It is true that this lowering of the scale of living is an evil, inasmuch as it tends to make society move in a retrograde direction: there is also a limit to the extent to which the scale of living can be lowered. The antecedent condition then on which the increase of population depends is its own labour, for it cannot increase without the increase of the means of subsistence, and such increase is the effect of labour only.

We can never contemplate human society in its origin. We must contemplate it in its progress and development. All theories as to how man *began* to propagate and gain the means of subsistence are useless towards the solution of any problem that concerns his condition. We know this, and no more: at any given time and in any given state of society there is a certain population which subsists in a certain mode by and out of the means of subsistence which it then has; and these means are partly the product and accumulation of the actual generation and partly the accumulation of their progenitors. If the means of subsistence (thus understood) of that population are sufficient, and no more than sufficient, any increase of the population must be preceded by increased labour, or by labour rendered more productive. We cannot suppose the population to increase first, and then the additional means of subsistence to be produced; for by the supposition the actual population has only sufficient, and that which is 'increase' must be fed out of some other store.

If it is said that children may be born and die immediately, or very soon, the answer is, they either die before they have partaken of the means of subsistence, in which case they no more enter into the reckoning than 'means of subsistence' produced but not enjoyed, because from some accident or cause these 'means' perished before they could be used; or the children did live to partake of the means of subsistence, in which case they are properly included in the word 'increase.'

Now the fact is, that in some countries the means of subsistence are barely sufficient for the existence of the actual population; in others they are more than barely sufficient. In the former case there can be no increase of population until there has first been an actual increase, in the means of subsistence; in the latter there may be an increase of the population before there is an increase of the means of subsistence, and this increase of population may go on without any increase in the means of subsistence, until the people have reached the lowest limit of subsistence.

It is clear then that the 'means of subsistence' (as above explained) must be first, and increase of population may then follow, and generally does follow to the full amount of these increased means of subsistence; and further, population may and sometimes does increase beyond the amount of such increased means, but it is then of necessity checked by actual suffering in the whole or in a part of the society. And this, we conceive, is the meaning of Mr. Malthus's proposition.

There seems to be an error (or rather, looseness of expression in most writers) in the mode of comparing the rate of increase of the two things, 'means of subsistence' and 'population.' There can be no useful comparison of the rate of increase between these two things except this: a given population may attain its increase, which is proportionate to the antecedent increased means of subsistence, in a less time than these increased means of subsistence were produced; or it may take a longer time. There is also no question about a *tendency* to increase either in the one thing or the other; the question is about an actual increase, which can only take place under the conditions already stated.

The question is perplexed, and its true statement rendered difficult by the fact that an increase of the whole means of subsistence and an increase of the population may be, and generally are, going on at the same time; and it seems to have been supposed that this increase of population, during a given time, is owing to the *then* increasing means of subsistence. But this cannot be true if it shall be admitted that a given amount of population cannot be increased, unless the actual amount of the means of subsistence of that population is first increased, or, which is the same thing, the rate of living is reduced. If some writers on this subject have not meant what is here imputed to them, they have certainly not sufficiently guarded themselves against the imputation.

There is still another consideration which perplexes the question. For very short periods it is certainly conceivable, and it is very probably the case, that sometimes population is increasing (in a certain sense) at a faster rate than the means of subsistence; that is, taking short intervals, it will or may be found that the population, during such intervals, has outstripped the means of subsistence existing at the end of such intervals, and a part of it must therefore die. These deaths consequently take place either in the whole population, or among those whose means of subsistence are reduced; for some parts of the community may and do enjoy, under such circumstances, as much as they did before, while others do not. In practice, a deficient allowance is not distributed among all, but some suffer and others do not. But on the other hand it is conceivable, and it may be true, that for short intervals the means of subsistence may sometimes be increasing more rapidly than the contemporaneous increase of population; that is, the actual population may possess and be producing and accumulating the means of subsistence more than sufficient for the sustentation of themselves and of the addition to the population made during the time of such production and accumulation. Now this is certainly the fact in many societies, as to part of the society; one part is producing and accumulating more than is necessary for the increase of the population which it is producing: this is the case with many of the middle classes in all industrious communities. At the same time another class is increasing its population at a greater rate than the means of subsistence applicable to such increase: the check to such an increase is obvious. There is no reason why this may not be true of a whole population, as it is of a part.

On the whole, the experience of mankind proves that the sexual passion will, if unrestrained, always increase the population by new births up to the level of the means of subsistence at each moment existing; while the appetite for labour, by which the means of subsistence are produced, is easily satisfied. It would not seem strange then, if during short intervals the propagation of the species has been so active as to have outstripped the means of subsistence existing at the end of such intervals. But though the population during short intervals may so increase, its increase at the end of a series of such consecutive intervals can only be the effect of a previous increase in the means of subsistence; always supposing the condition of the people not to be growing worse, for there may be, as already observed, an increase of population up to the limit of a bare subsistence, without any actual increase in the whole means of subsistence. Therefore the increase of the means of subsistence, that is, the products of human labour, are the antecedent conditions of any actual increase, and the increase of population may be to the amount of such increase, but cannot surpass it. If for short periods the increase of population does surpass the increase on which by the supposition it depends, the increase is checked; and on taking the account at longer intervals, there is, or may be, no actual increase of the population. If for short periods the increase of the means of subsistence surpasses the increase of population, this is made up in the next periods by an increase in the population. There is then, or may be, a constant fluctuation for short periods, the population and the means of subsistence alternately increasing with greater rapidity. But any increase of population, even for a short period, supposes a previous increase of the means of subsistence over those which the actual population found to be merely sufficient before the commencement of such short period; whatever may be the comparative rates of increase between the two during such short period. It seems then that in the sense here explained population may so rapidly increase that at the end of an interval from the commencement of which the increase of population is reckoned, the means of subsistence existing at the commencement of such interval, and which were sufficient for the then population and something more, added to the means of subsistence produced during such interval, may be insufficient to support the population existing at the end of such interval, in the same way in which the population existing at the commencement of such interval was living; and, on the other hand, the means of subsistence existing at the end of such interval may be more than sufficient to support the population existing at the end of such interval in the same way of living. At the end of any long interval, if there is an increase of population, as compared with the commencement of such interval, there has been during such interval, on the whole, a balance on the side of the means of subsistence, provided the mode of living has not been lowered; and à fortiori, there must have been such balance, if the mode of living has been raised; that is, the means of subsistence at the commencement of such interval, and those produced during it, have been sufficient to produce and leave in existence at the end of such interval, a larger population than at the commencement of it. This excess on the side of the means of subsistence, if distributed equally through every moment of the long interval, would leave at the end of each such interval a surplus of subsistence, the antecedent condition of an increase in the following interval. The actual fact may be that in some intervals population has passed a little beyond what was provided at the beginning of and during such intervals, the consequence of which is a diminution in its rate of increase in the next interval, and sometimes an increase of deaths. In discussing this question, it is always actual increments that are to be considered, and both for short and long periods. The tendency is nothing; for a tendency of any kind, that is, a capacity to or for a given end, means nothing in such speculations as these, unless it becomes an effect.

The principle of population is stated by Mr. Malthus with more precision than by some writers who have adopted his opinions; and though it seems to us that his language is not always quite free from objection, his real meaning is perfectly so. His correspondence with Mr. Senior shows this. The importance of right notions on this subject must be our apology for this further attempt at explaining it.

PO'PULUS. [ROME.]

PORCELAIN. [POTTERY.]

PORCELLA'NA, Adanson's name for the testaceous form known to modern zoologists by the name of *Marginella*. The name is now in general use for a genus of *Crustacea*. [PORCELLANIANS.]

PORCELLA'NIANS, a tribe of *Anomurous Crustaceans*, placed by M. Milne Edwards next to the *Pagurians*, and immediately preceding the section of *Macrurous Decapods*.

M. Milne Edwards observes that this small tribe is principally composed of crustaceans which have quite the port of the *Brachyura*, but which are distinguished from all the *Decapods* of which that author had previously treated by their fan-like caudal fin, more or less resembling that of the *Macrura*. He states that he only knows a single genus having this conformation, viz. the *Porcellanæ*. He has however thought fit to arrange in the same division *Æglea*, which establishes the passage between the *Porcellanæ* and the *Galatheæ*, and which have hitherto been approximated to the last, as well as *Megalops*, which form is perhaps nothing but the young state of some genus of the preceding family, whose development is not complete. To distinguish between these three genera it is sufficient to recollect that in the *Porcellanæ* and the *Ægleæ*, the fifth pair of feet are filiform and bent back above the others, whilst in *Megalops* they are formed like them, and that the *Ægleæ* have the body elongated and the abdomen very stout, whilst the *Porcellanæ* have the body nearly circular and the abdomen very delicate. Provisionally, M. Milne Edwards arranges *Monolepis* of Say in this tribe, which form M. Milne Edwards says that he has not examined, but which he thinks ought to be considered as young crustaceans whose true characters are not known.

Porcellana. Lam.

Generic Character.—General form resembling that of the *Brachyura*. *Carapace* ordinarily as wide as it is long, suborbicular and depressed above. *Front* advanced above the insertion of the internal antennæ, and even capable of covering them completely when they are bent back, without there being, nevertheless, antennary fossets. *Eyes* small and lodged in a sort of *orbit*, the upper wall of which is well formed, but the limits of which are not determined externally and internally except by the antennæ, and whose inferior border is very short and scarcely projecting: this last border is prolonged externally, and there is between the kind of crest thus formed and the border of the carapace a deep furrow, from which the *external antenna* springs; these appendages are inserted consequently outside the eyes; their basilary portion is composed of three cylindrical joints, the second of which is the greatest, and their terminal stem is very long. The *buccal frame* is quadrilateral, but much too small to receive the external *jaw-feet*, which, in bending back, are applied against the lower border of the front. These last appendages are very large; their second joint presents on the internal side a large lamellar dilatation with rounded borders, and its anterior and external angle is prolonged so as to form a more or less stout tooth; the third joint is much smaller and nearly triangular; the joints which follow diminish successively, and are furnished internally with very long hairs; there is also, as ordinarily, an external stem or pulp, terminated by a small multi-articulate filament, but there is no *flagrum*. The *sternal plastron* is very wide and nearly circular. The anterior *feet* are very large and more or less flattened; the arm is very short and never reaches much beyond the carapace; but the carpus is very long, and presents in general a lamellar prolongation, which advances above the superior border of the hand when it is bent back. The pincers are strong, and little or not at all dentated. The three succeeding pairs of feet are nearly cylindrical, and terminated by a conical tarsus; the last pair are very slender, bent back above the base of the others, and terminated by a small didactylous pincer. The *abdomen* is wide but lamellar, and bent below against the sternum; it is composed of seven distinct rings in a large fan-shaped fin consisting of five blades, and formed by the last segment and by the appendages of the preceding ring; the basilary piece of these appendages is very short, and carries two great oval blades nearly of the same size, ciliated on their edges, and divided backwards. The median piece of this fin does not reach beyond the lateral appendages, and presents furrows which seem to indicate that it is formed by the soldering of the seventh abdominal ring with a pair of lamellar appendages belonging to this same segment. The underside of the abdomen is more or less membranous, and presents in the male a single pair of appendages fixed to the second ring, and each composed of a small cylindrical stem terminated by an oval lamella. In the female are found two or three pairs of oviferous feet, which are fixed to two or three rings which precede the penultimate ring, and each composed of a multi-articulate stem. Lastly, the *branchiæ* are fourteen on each side, and are disposed in bundles of two above the external jaw-foot and the anterior foot, and of three above the three succeeding pairs of feet; there is however but one above the posterior foot. (M. E.)

M. Milne Edwards divides this genus into the following sections:—

§ 1. Species whose front is entire and does not present lateral teeth.

a. Front triangular.

Example, *Porcellana violacea*. Length about an inch.

Locality.—The coasts of Chile.

N.B. The species belonging to this section appear to have a wide geographical range: some are recorded from New Zealand, New Ireland, Java, and the Isle of France, as well as Chile.

a, a. Front straight or slightly rounded.

Example, *Porcellana sculpta*. Colour reddish with great white spots. Length about three lines.

Locality.—The coasts of Java.

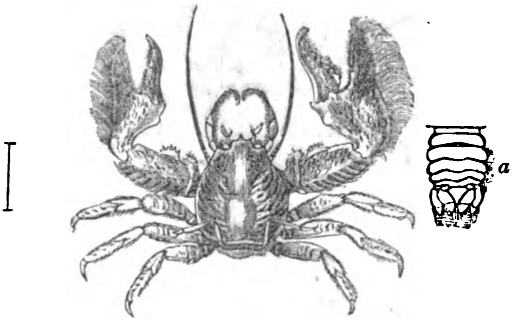
Two other species are recorded, one of them from the China seas: the other is *Porcellana viridis*, Gray, *Zool. Misc.*; *Pisidia viridis*, Leach.

§ 2. Species whose front is divided into three or five teeth or lobes.

b. Hands very wide and flattened. Pincers triangular.

Example, *Porcellana platycheles*. Length about 7 lines. Colour brownish.

Locality.—Coasts of England and France.



Porcellana platycheles. *a*, tail unfolded.

b, b. Hands long, narrow, and thick; pincers slender.

Example, *Porcellana longicornis* (*Pisidia longicornis*, Leach; *Cancer longicornis*, Penn., *Brit. Zool.*). Length about 3 lines.

Locality.—Coasts of England and France.

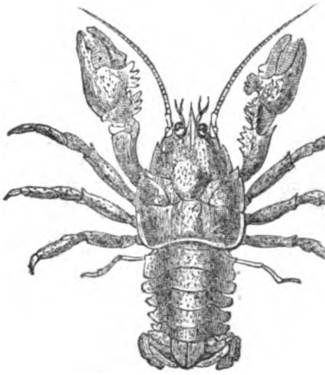
M. Milne Edwards thinks that the division of this genus into two, under the name of *Pisidia*, as well as *Porcellana*, by Dr. Leach, has been effected without sufficient reason. M. Desmarest, though he adopts it, shows that the former genus is established upon insufficient characters; therefore M. Milne Edwards thinks that it ought to be abandoned.

Æglea. Leach.

Generic Character.—*Carapace* depressed and much longer than it is wide, divided into two portions by a furrow which separates the stomachal from the cardial and branchial regions: these last are dilated, and terminated externally by a trenchant border. The *front* is armed with a rostrum, at the base of which is seen on each side a notch which represents the orbit. *Ocular peduncles* very short and directed forwards. *Internal antennæ* inserted below the ocular peduncles, and their very short stem bent back between those organs and the base of the rostrum; their basilar joint globular. *External antennæ* inserted on the same line as the internal ones, in the lateral angle of the carapace; their peduncle composed of four joints, the three first of which are extremely small, and the fourth cylindrical and more elongated. *Buccal* frame wider forwards than backwards, and not separated from the epistome. *External jaw-feet* pediform; their second and third joints scarcely larger than the three last, and exceeded by the palp. *Sternal plastron* triangular and very wide at its base, which is situated between the fourth pair of feet. Last segment of the thorax very moveable and fairly developed. Anterior *feet* of moderate length, but stout and convex, directed forwards and not outwards as in the *Porcellanæ*, and bent back below; the claw is strong and slightly hollowed out into a spoon-shape at the end. The three succeeding pairs of feet are slender and moderate; their tarsus styliform and rather elongated. Posterior feet slender, cylindrical, nearly filiform, terminated by a rudimentary claw, and bent back above the base of the others, or even in the branchial cavity. *Abdomen* shorter than the carapace, and habitually recurved below against the thorax, so tht it is impossible to straighten it completely; it is very wide, and furnished above with seven crustaceous segments, but completely membranous below. The fin which terminates it is very wide, but its median piece (formed by the seventh abdominal ring) is small, and does not form a fan with the lateral pieces, which are distant from it, and supported on a very long basilar joint. In the male, the first five rings of the abdomen are completely deprived of appendages; but in the female there are four pairs of false oviferous feet, which are simple, nearly membranous, and each terminated by a small oval blade. (M. E.)

M. Milne Edwards remarks that this genus, in his opinion, approaches the *Porcellanæ* more nearly than the *Galatheæ*, next to which they had been hitherto placed; but the conformation of the abdomen of the *Ægleæ* seems to him to indicate that their natural position is in the section of *Anomura*. [Galatheidæ.]

Example, *Æglea lævis*. Length about two inches.
Locality.—Coasts of Chile.



Æglea lævis.

Megalops, Leach.

M. Milne Edwards observes that the small crustaceans designated by this generic name has much analogy with the *Galatheidæ* as well as the *Porcellanidæ;* and if they be really animals arrived at their entire development, they would seem to establish the passage between the *Anomurous* and *Macrurous Decapods;* for their abdomen, though it does not present at its extremity five blades united into a fan-shape, as in the last, is very much developed, and serves for natation. But he is led to believe that they are only the young of some anomurous crustacean; and that when the form has been better studied, it will be erased from the list of genera which compose the order of *Decapods*, or, at least, will be assigned a different place and other characters. [Megalops.]

Monolepis, Say.

M. Milne Edwards is inclined to believe that this genus ought not to be retained, and that it has only been established on young crustaceans not arrived at their complete development; but not having himself observed them, he cannot form a decisive opinion on this point. They appear, he adds, to have the greatest analogy with *Megalops* and young *Dromiæ*. The reader is referred to Mr. Say's paper on the subject, in the 'Journal of the Academy of Philadelphia;' to Desmarest's work (*Consid. sur les Crust.*); and to the 'Histoire Naturelle des Crustacés' of M. Milne Edwards. The species recorded are both American.

PORCE'LLIO. [Isopoda, vol. xiii., p. 55.]

PORCH (from the Latin *porticus*), a general term for any projection forming a covered space immediately before the entrance to a building, open in front, and more or less enclosed at its sides. The distinction between a porch and a portico is, that, however important it may be as a feature, the former appears only a subordinate part of the building to which it is attached; whereas the other [Portico] may be the whole of a front: therefore, though the term porch is usually employed only in speaking of Lombardic, Norman, Gothic, and similar styles, it would be more correct and convenient to apply it, without regard to style, to what bears the character of a porch. By attending to such distinction, misconception would sometimes be prevented: for instance, if the Athenæum Club-house, London, were described as having a Doric portico, any one unacquainted with the design would imagine that the order was carried up as high as the general entablature of the building; whereas by terming it a Doric porch, such misconception would be avoided.

As far as we are aware, the only instance of a porch in Greek architecture is that in the octagonal structure called the Tower of the Winds, or that of Andronicus Cyrrhestes, which has a small prostyle portal on two of its faces, north-east and north-west, each consisting of a simple distyle, or two columns and their entablature, surmounted by a pediment; and which therefore may be regarded as the prototype of those ornamental compositions for doors and windows, so greatly affected in Italian architecture, which present a *microstyle* application of the orders, that is, small columns adapted not to the entire structure, but to subordinate parts of it.

When portico fronts were laid aside, as partaking too much of the previous Pagan temple; when columns began to be not only attached to the building, but employed as microstyle decorations to its different external stages or stories, often very irregularly, and generally connected together by arches; in short, when the Roman style was transformed into and superseded by the Byzantine—or what Mr. Wightwick terms the Constantinal—and the Lombardic styles, porches began to be important features, subordinate indeed in size to the structures to which they were attached, but principal in regard to embellishment, being frequently composed of groups of small columns, elaborately wrought, and some of them often placed on the backs of lions or other animals, and supporting a series of concentric arches or archivolt mouldings equally enriched. Here microstyle embellishment may be said to have been carried to such a height as to be ultimately lost sight of: the columns became at length mere subsidiary members, and a combination of vertical mouldings or shafts cut out of the receding angles constituted the general splay of the whole portal, which was thus extended in appearance ad libitum, without regard to the size of the actual doorway or aperture itself, a very important advantage as regards design. In the Norman-Gothic style, the porches or portals are little more than a modification of the similar features in Byzantine and Lombardic architecture. Of porches however strictly so called, that is, portals projecting out from the edifice, so as to form a sheltered external vestibule, we have few Norman instances, and those do not occur in the principal front, but at the sides of buildings. The same also is the case in Gothic architecture, where, though we often meet with spacious and magnificent portals, especially in continental examples, we do not find advanced porches brought out beyond the general plan of the building in front; the porch being there almost invariably enclosed within the lower part of the structure, even where it may be said to project with respect to that part of the front which is seen above it, but on a different plane, as for instance in the front of Westminster Hall, Winchester Cathedral, &c., although in those cases the entrances are placed rather within deep recesses than porches. In church architecture, entrances of the last-mentioned kind hardly ever occur at the west end or front, but were frequently made very conspicuous features in the side elevations, of which we have striking instances in the beautiful north porches at Salisbury and Wells cathedrals, both of which advance out very considerably.

In our antient domestic architecture, on the contrary, the porch, where it occurs at all, forms a marked, though not always a central feature, in the principal front. When it projects from the main structure, it is usually carried up so as to have a room, or else what forms a bay in a room, over it; and it is not unfrequently carried up higher than the rest, so as to form a kind of tower; or else the porch is recessed within the building, and presents externally merely an open arch. In many Elizabethan buildings, the porch, though forming a narrow compartment of the whole front, is profusely ornamented, even where the rest is quite plain. Kirby, in Northamptonshire, the seat of Lord-Chancellor Hatton, offers a most elaborate, not to say extravagant, example of the kind. In modern imitations of our older domestic architecture, it is now usually the practice to form the entrance porch in such manner that carriages can drive into it, by making an arch of sufficient width on each of its returns or sides. But as it is generally managed, the effect is seldom good, or indeed tolerable. Even that which forms the state entrance in the quadrangle at Windsor Castle is by no means unexceptionable.

PORCHESTER CASTLE. [Hampshire.]

PO'RCIA. [BRUTUS.]

PORCUPINES, *Hystricidæ*, a family of rodent quadrupeds.

The genus *Hystrix* of Linnæus embraces those *Rodents* whose covering consists, for the most part, of a kind of offensive and defensive armour, in the shape of spines or quills, instead of hairs.

Cuvier, who places the *Porcupines* between the genus *Myopotamus* [COYPOU] and the genus *Lepus*, observes that they are to be recognised at the first glance by the stiff and pointed spines with which they are armed, after the manner of the *Hedgehogs* among the *Carnassiers*. Their molars are, he proceeds to state, four in number, with a flattened crown, variously modified by layers of enamel, which leave deep intervals; their tongue is rough with spiny scales; their clavicles are too small to be applied to the sternum and omoplate, and are only suspended by ligaments. Many of them live in burrows, and have much the habits of Rabbits. Their grunting voice, joined to their large and truncated muzzle, has, he says in conclusion, caused them to be compared to the Hog, whence their French name *Porc-Epic*, and, he might have added, their English appellation.

He divides the group into, 1, the Porcupines properly so called (*Hystrix cristata*, Lin.); 2, *Atherura*, Cuv. (*Hystrix fasciculata*, Lin.); 3, *Les Ursons* (*Eréthisons*, F. Cuv.; *Hystrix dorsata*, Lin.); and, 4, *Les Coendous* (*Synætheres*, F. Cuv.; *Hystrix prehensilis*, Lin.; and *Hystrix insidiosa*, Licht.).

Mr. J. E. Gray makes the '*Histricidæ*' the second family of the order *Glires*, with the following character:—

Cutting teeth two in each jaw, lower truncated; grinders 4—4 in each jaw, rooted, compound; tongue and body covered with spines; clavicles none.

† Tail short.

1. '*Histrix*.' 2. *Acanthia*.

†† Tail elongated.

3. *Erythizon*. 4. '*Spygurus*.' 5. '*Simthurus*,' F. Cuv. (Synetheres ?).

This family is placed by Mr. Gray between the *Muridæ* and *Leporidæ*.

Mr. Bennett (*Zoological Gardens*) remarks that all the Porcupines have four cheek-teeth on each side of either jaw, furnished with distinct roots, nearly equal in size, irregular but somewhat circular in outline, presenting in the young state, on the surface of their crowns, several tubercles, of various size and form. He goes on to observe that, as the teeth are worn down, in advancing age, these tubercles give rise to as many elliptical layers of enamel occupying the centre of the tooth, while its circumference is marked, both internally and externally, by a folding inwards of the outer coat. He well describes their other leading features and peculiarities. 'Their tongues,' says he, 'are roughened by papillæ, like those of cats; their heads generally short and truncate; their nostrils large and open; their ears and eyes comparatively small; and their general form short, thick, and clumsy.'

With regard to the arrangement of this natural family, proposed by M. F. Cuvier, the same author observes that the French zoologist has attempted to subdivide it into smaller generic groups, dependent chiefly on his own theoretic notions of the value of the slightest modifications in the form of the skull and teeth in the discrimination of genera. Some variations in the number of toes, and still more remarkable peculiarities in the structure of the tail, are brought in aid of this subdivision; but Mr. Bennett remarks that he can scarcely admit the justice of M. F. Cuvier's views, unless when supported by a marked difference in the mode of life, such as exists between the burrowing porcupines of the old continent, the arboreal species of North America, and the prehensile-tailed climbers of the south. Mr. Bennett, however, though not without some hesitation, adopts the views of M. F. Cuvier with regard to *Atherura*, which he considers as furnishing the type of a new genus, to which he would add, as a second species, the *Landak* of Marsden's 'History of Sumatra.'

Mr. Swainson expresses a suspicion that the genus *Hystrix* is one of the most typical in the order *Rodentia*, and he observes that M. F. Cuvier appears moreover to have distinguished the five types of forms which Mr. Swainson thinks every natural group is sure to contain.

The typical or *Common Porcupine* has, says Mr. Swainson in continuation, the spines of very great length, but the tail is very short.

The next type is M. F. Cuvier's subgenus *Erethizon*, in which, Mr. Swainson observes, the proportions of the European species are, as it were, completely reversed. The hair of the body, which in *Hystrix* is much shorter than the spines, in this type is considerably longer; while the spines themselves are so short that at a distance they are scarcely seen. The tail also is nearly half as long as the body.

The third subgenus, he remarks, has the tail, which is short in *Hystrix*, and moderate in *Erethizon*, of considerable length, and it is further distinguished by being prehensile. 'A more important circumstance,' continues Mr. Swainson, 'for considering this animal as the type of a subgenus could not possibly be named. One half of the tail is covered with spines, and the other with scales. There is no doubt that M. F. Cuvier is perfectly right in supposing that the species described by Azara is different from that mentioned by Buffon. We ourselves in fact, although unable to transport the skins, have seen two very different kinds of these prehensile-tailed porcupines in the forests of Brazil; and no doubt others exist in that vast continent. This fact however is sufficient to show that M. F. Cuvier, one of those "amateurs of generic divisions," as he is spoken of by a modern compiler, has founded this genus upon the most solid principles. The Indian porcupines constitute the subgenus *Acanthion*, and they differ very remarkably from all the preceding; the spines are no longer round, but assume the flattened appearance of strips of parchment; indeed M. Cuvier remarks that in one species, the *Hystrix fasiculata* of Linnæus, the spines of the body are flattened like a sword-blade; the tail is long and terminated by a bundle of spines, "flattened like strips of parchment." There must be something very different in the habits of these Indian porcupines from those of America and Europe; nor would an ordinary observer class them in the same genus; for we even find that Desmarest, one of the best zoologists of France, considers the animal in question as belonging to the genus *Mus*, or in other words, a species of spined rat. Thus much for the distinctions of the subgenus *Acanthion*, of which three species have already been discovered.'

The last subgeneric group noticed by Mr. Swainson is *Sphigurus*, and, in further proof that M. F. Cuvier has unconsciously marked out the circular arrangement, and defined the natural subgenera of the genus *Hystrix*, Mr. Swainson remarks that the two most typical, *Hystrix* and *Acanthion*, agree in their teeth, while the three aberrant types, namely, *Erethizon*, *Synætheres*, and *Sphigurus*, possess certain modifications, constant among themselves, but sufficiently distinct from the former.

In the arrangement at the end of the volume (*Classification of Quadrupeds*) from which we have quoted, the genus *Hystrix* stands at the head of the second division of the Glires (*clavicles rudimentary or none*), and Mr. Swainson adopts the following subgenera, established by M. F. Cuvier, but rejects *Atherura*, as being only an aberrant species:—*Acanthion*, *Erethizon*, *Synætheres*, and *Sphigurus*. The genus *Hystrix* is followed by that of *Lepus*.

Mr. Waterhouse, in his tabular view of the distribution o the *Rodentia*, laid before the Zoological Society of London, in November, 1839, makes the subfamily *Hystricina* consist of the *Hystricidæ*, the *Octodontidæ*, the *Chinchillidæ*, and the *Caviidæ*. To Europe and North Asia he gives one species of *Hystricidæ* (*Hystrix*). To North America one (*Erethizon*). To Africa one (*Hystrix*). To India and the Indian Islands two, viz. one *Hystrix* and one *Atherura*. To South America and the West Indian Islands he gives five, viz. three of *Cercolabes* and two of *Synætheres*.

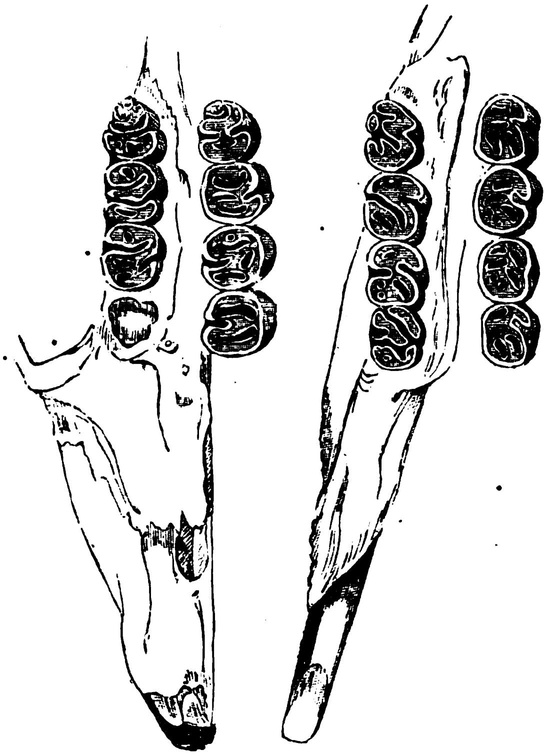
We proceed to lay some of these forms before our readers.

Hystrix, Linn.

This genus is distinguished by the head being more or less convex, and by the development of the bones of the nose, which are very much extended; temporal and orbital fossæ very small; parietal bones depressed, occipital and sagittal crests projecting very much, tail short, not prehensile, feet plantigrade, the anterior tetradactyle, the posterior pentadactyle, armed with large nails.

M. F. Cuvier gives to the Porcupines (*Hystrix* and the *Acanthions*) the following—

Dental Formula:—Incisors $\frac{2}{2}$; molars $\frac{4-4}{4-4} = 20$.



Teeth of Hystrix (F. Cuv.).

Example, *Hystrix cristata*, the *Italian* or *African Porcupine*, or *Common Porcupine*.

Description.—When full grown about two feet in length; longest spines exceeding a foot. General colour grizzled dusky black, resulting from an intermixture of various shades of white, brown, and black. Upper part of the head and neck furnished with a crest of long lighter-coloured hairs capable of being raised or depressed at pleasure. Hair on the muzzle and limbs very short, almost black on the limbs; that of the neck and under parts brownish, and of considerable length. On the fore-part and sides of the neck a whitish band; all the remaining parts of the back and sides, including the rump and upper parts of the hinder legs, armed with spines, which are longest on the centre of the back. The spines almost of the thickness of a goose-quill in the middle, supported at the base by a slender pedicle, and terminating in very sharp points, striated longitudinally and ringed alternately with black and white; the rings an inch or more broad. Their usual position is lying nearly flat upon the body with the points directed backwards; when the animal is excited they are raised by the means of the subcutaneous muscles, almost at right angles with the body, and then present a very formidable appearance. They are not capable of being detached at the pleasure of the animal. The tail-quills are, as it were, cut off in the middle, and consequently open at the ends, and produce a loud rustling noise when the animal agitates its tail. (Bennett.)

Hystrix cristata.

This is the ὕστριξ (Hystrix) of Aristotle and the Greeks, and according to Agricola, the ἀκανθοχοιρος (Acanthochœrus) of the latter; *Hystrix* of the antient Italians; *Istrice* of the modern Italians; *Porcépic* of the French; *Stachelschwein*, *Dornschwein*, and *Porcopick* of the Germans.

Habits, Food, &c.—The Porcupine is a nocturnal animal, sleeping in its burrow during the day, and coming forth at nightfall to seek its food, consisting principally of roots, fruits, and tender leaves. Thunberg states that its usual food near the Cape, where it is called *Yzer-varken*, is the root of that beautiful plant the *Calla Æthiopica*, which grew even in the ditches about the gardens; but he adds that it will frequently deign to put up with cabbages and other vegetables, and sometimes commits great depredations in those gardens. The story of its power of shooting its quills to a distance at its enemy is merely glanced at by Aristotle (*Hist. Anim.*, ix. 39), but dwelt upon by Pliny with his usual love for the marvellous. (*Hist. Nat.*, viii. 35.) Ælian, Oppian, and Claudian have repeated this tale with exaggerations. In suddenly raising his spiny armour, a loose quill may be detached by the porcupine; but the power of ejaculation to a distance does not exist. There are usually several openings to the porcupine's burrow, and it hybernates, but only for a short time. Mr. Bennett quotes Thunberg, not without observation on his credulity, for the use which he was told the Ceylonese Porcupine makes of the tail-quills. Thunberg was informed that it had 'a very curious method of fetching water for its young, viz. the quills in the tail are said to be hollow, and to have a hole at the extremity; and that the animal can bend them in such a manner as that they can be filled with water, which afterwards is discharged in the nest among the young.' Pennant says, 'These animals produce a bezoar; but according to Seba, only those which inhabit Java, Sumatra, and Malacca. These bezoars were very highly valued, and have been sold for five hundred crowns a piece. It has also been pretended that a stone was procured from the head of this animal infinitely more efficacious than other bezoars (Tavernier); but this may be placed among the many impositions of Oriental empirics.' In September, 1833, the secretary of the Zoological Society called attention to a young *Hystrix cristata* which had been recently brought forth in the menagerie, being the first instance of such an occurrence in this species, and respecting which he added that observation of the young while sucking confirmed the correctness of Blumenbach's statement that the nipple is nearly axillary.

Geographical Distribution.—'Hystrices,' says Pliny (*loc. cit.*) generat India et Africa.' Agricola, in his book, *De Animantibus subterraneis*, remarks, 'Hoc animal gignit India et Africa, unde ad nos nuper allatum est.' Pennant states that it inhabits India, the sand-hills on the south-west of the Caspian Sea, Southern Tartary, Persia, Palestine, and all parts of Africa. He adds that it is found wild in Italy, and is brought into the markets of Rome, where it is eaten, but that it is not originally a native of Europe (for this last he quotes Agricola). The specimens from Italy are generally rather smaller, and have shorter quills. See further the quotation from Mr. Waterhouse's tabular view cited above.

Lieut.-Col. Sykes has described a species under the name of *Hystrix leucurus*, *Sayal* of the Mahrattas, as *Hystrix caudâ albâ*. He states that the animal appears to be distinct from the European species, which it closely resembles in form and covering. It is nearly a third larger. All the spines and open tubes of the tail are entirely white, which is not the case in *Hystrix cristata*. The spines of the crest also are so long as to reach the insertion of the tail. The ears are much less rounded, and the nails are shorter, infinitely deeper and more compressed, and with deep channels below. The white gular band is more marked; and, finally, the Asiatic species is totally destitute of hair—spines, where wanting, being replaced by strong bristles even down to the nails. (*Zool. Proc.*, 1830, 1831.) Mr. Hodgson notes this species among the mammalia of Nepaul, as inhabiting the central and lower regions. (*Zool. Proc.*, 1834.)

Atherura, Cuv. (*Acanthion?* F. Cuv.)

Neither the head nor the muzzle convex; tail long but not prehensile; feet like those of *Hystrix*.

Example, *Atherura cristata, Hystrix fasciculata*, Shaw; *Le Porcépic à queue en pinceau*, Buff.

Cuvier describes this species as having the spines of the body hollowed into a furrow forwards, and having the tail terminated by a fasciculus of horny flattened strips (lanières cornées aplaties) constricted at intervals (etranglées d'espace en espace).

Mr. Bennett (*Gardens and Menagerie of the Zoological Society*) remarks that although tolerably described and figured by Buffon, this species had been lost to science until within two years from the time he wrote (1830), when it was recovered almost simultaneously both in its original habitat and in a very distant quarter of the globe. Sir Stamford Raffles, he observes, had cursorily referred to it, and he presumes that the authority on which it was formed into a new genus by Cuvier was a skeleton and skin transmitted from India by M. Diard in the year 1828. Nearly at the same time, he tells us, a living individual was brought to England and presented to the Zoological Society by Lieutenant Vidal, who accompanied the expedition for the formation of the projected colony at Fernando Po, where these animals were found in such plenty as to afford a staple article of food to the inhabitants. It has been conjectured, he adds, on very probable grounds, that they are not indigenous in the island, but had been brought thither from the East by the Portuguese, who were formerly settled there; but he observes that the space interposed between the two regions can scarcely be regarded as conclusive evidence of their having been introduced into the colony, while there are such striking instances of animals common to India and the west of Africa as are furnished by the lion, the leopard, &c.

Mr. Bennett proceeds to state that in the teeth and in the organs of motion it corresponds, as Baron Cuvier has noticed, with the common Porcupine, from which it differs chiefly in the form of the head; the line of its profile, instead of being elevated into a curve of large extent, passing in almost a straight direction from the occiput to the extremity of the nose. In these respects, Mr. Bennett remarks in continuation, it agrees with M. F. Cuvier's genus *Acanthion*, founded on this very character observed by the latter on two skulls preserved in the Paris museum, the one from Java, the other, in all probability, from Africa. These coincidences would have induced Mr. Bennett to consider the two genera as identical, were it not that Baron Cuvier has omitted all mention of that established by his brother, although the materials for comparison were fully at his disposal: M. F. Cuvier moreover enumerates them both in his genera of *Mammalia*.

Mr. Bennett further observes that Linnæus founded his *Hystrix Macroura* on Seba's figure; but Buffon having quoted neither Seba nor Linnæus, Dr. Shaw took it for granted that this was a different animal, and consequently gave it a new name—*Hystrix fasciculata*. Mr. Bennett entertained however but little doubt, notwithstanding some trifling discrepancies in the figures, that Sir Stamford Raffles was right in his conjecture that they both represent one and the same species.

The following is Mr. Bennett's accurate description:—'The differences between this species and the common Porcupine are obvious at the first glance. Its general colour is nearly the same, but with less intermixture of brown. The upper parts of the body, the outer sides of the limbs, and the head, neck, and face, are of this dusky hue; but the under parts, inside of the limbs, fore part of the neck, and throat, are of a greyish white, with the exception of a darker band which crosses the breast in front of the fore legs. The spines commence upon the back of the head, where they are little more than an inch in length, and extend to the root of the tail, occupying nearly the whole of the back and sides. The longest are scarcely more than from four to five inches in length, and extend to the root of the tail, occupying nearly the whole of the back and sides. They are mostly white at the base and black towards the extremity, but many of them are black throughout, and others black above and white beneath. All of them are marked on the upper surface by a deep and broad groove running the whole of their length, and terminate in very sharp points. The skin in which they are implanted appears perfectly white, and where the spines are most numerous, is scarcely furnished with a single hair. A few slenderer spines running into long black bristles are occasionally intermixed with the others. The greater part of the tail is bare both of hairs and spines, and covered only by flat blackish scales disposed in rings, the tip alone being surmounted by a tuft of long flat bristles having the form neither of hairs nor of quills, but bearing a close resemblance, as Buffon has aptly remarked, to narrow slips of parchment cut in an irregular manner. This tuft is of a whitish colour, and about two inches in length. The entire length of the body in our specimen is little more than a foot, and that of the tail from four to five inches. The whiskers are very long; the eyes small and black; and the ears short, round, and naked.'

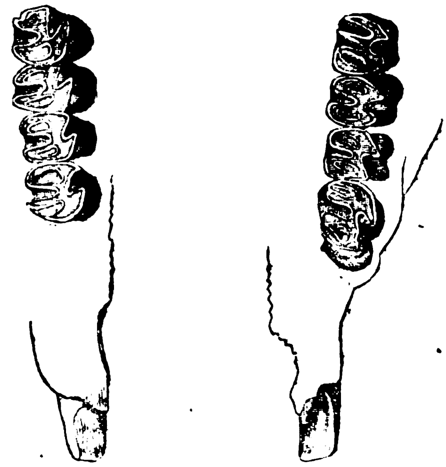
Habits, Food, &c.—The author last quoted states that, like the rest of its tribe, this species sleeps during the day, and becomes in some degree active only on the approach of night. Its intelligence, he adds, is equally limited, and its manners equally fretful with those of the common species, like which, 'it raises its spines when irritated or disturbed, stamps with its feet upon the floor of its cage, and swells and looks big in its defensive armour.'

Geographical Distribution.—The neighbourhood of the Celebes (Seba); Asia (Linn.); Malay Peninsula (Buffon); Isles of the Indian Archipelago (Pennant); Sumatra (Sir Stamford Raffles); Fernando Po (Vidal).

Erethizon. (F. Cuv.)

Cranium flat; muzzle short and not convex; tail moderate; quills short and half hidden in the hair.

The following is from M. F. Cuvier's figure of the teeth of *Erethizon*, *Synœtheres*, and *Sphigurus*.



Teeth of Erethizon, &c. (F. Cuv.)

Example, *Erethizon dorsatum, Hystrix dorsata*, Linn.

Description.—Ears short, hid in the fur; head, body, legs, and upper part of the tail covered with soft, long, dark-brown hair; on the upper part of the head, back, body, and tail, numbers of sharp strong quills, the longest on the back, the least towards the head and sides, the longest three inches, but all hid in the hair; intermixed are some stiff straggling hairs, three inches longer than the rest, tipped with dirty white; under side of the tail white; four toes on the fore feet, five behind, each armed with long claws, hollowed on their under side; the form of the body is exactly that of a beaver, but is not half the size; one which Mr. Banks brought from Newfoundland was about the size of a hare, but more compactly made; the tail about six inches long. (Pennant.)

These animals vary in intensity of colour. Pennant alludes to one entirely white in the possession of Sir Ashton Lever.

This is the *Cavia Hudsonis* of Klein; *Hystrix Hudsonius* of Brisson; *Hystrix pilosus* of Catesby; *Hystrix dorsata* of Linnæus; *L'Urson* of Buffon; *Canada Porcupine* of Forster, Pennant, and others; *Cawquaw* of the Cree Indians; and *Ooketook* of the Esquimaux.

Habits; Food; Geographical Distribution.—The *Canada Porcupine* is a sluggish animal. Hearne says that the Indians going with packets from fort to fort, often see them in the trees, but not having occasion for them at the time, leave them till their return, and should their absence be a week or ten days, they are sure to find the porcupines within a mile of the place where they had before seen them. Mr. Hutchins states that, in walking, the tail is drawn along the snow, making a deep track, which is often the means of betraying the animal; but that its haunts are most readily discovered by the barked trees on which it has fed, which, if barked the same winter, are sure signs of their vicinity. They are, he says, usually found on the branches, and, on approaching them, they make a crying noise like a child. Then the tree is cut down, and the animal killed by a blow on the nose. Dr. Richardson informs us that this species is found on the banks of the Mackenzie, as high as lat. 67°, and that, according to American writers, it ranges as far south as lat. 37°. He adds, that it is said to be very rare in Virginia, but to be numerous in some parts of Kentucky; and that it is reported to have multiplied greatly, of late years, near Oneida Lake in the state of New York. (Cozzens.) Dr. Richardson further states that in the fur countries it is most numerous in sandy districts covered with the *Pinus Banksiana*, on the bark of which it delights to feed; that it also eats the bark of the larch and spruce firs, and the buds of various kinds of willow; and that, in the more southern districts, it is said to feed chiefly on the bark and leaves of the *Pinus Canadensis* and *Tilia glabra*, and to be fond of sweet apples and young maize, which it eats in a sitting posture, holding the food to its mouth with the fore-paws. 'It is,' continues the Doctor, 'readily attacked by the Indian dogs, and soon killed, but not without injury to its assailants, for its quills, which it erects when attacked, are rough, with minute teeth directed backwards, that have the effect of rendering this seemingly weak and flexible weapon a very dangerous one. Their points, which are pretty sharp, have no sooner insinuated themselves into the skin of an assailant, than they gradually bury themselves, and travel onwards until they cause death by wounding some vital organ. These spines, which are detached from the porcupine by the slightest touch, and probably by the will of the animal, soon fill the mouths of the dogs which worry it, and unless the Indian women carefully pick them out, seldom fail to kill them. Wolves occasionally die from the same cause. The Canada Porcupine makes its retreat amongst the roots of an old tree, and is said to pass much of its time in sleeping. When disturbed, it makes a whining or mewing noise. It pairs in the latter end of September, and brings forth two young ones in April or May. Its flesh, which tastes like flabby pork, is relished by the Indians, but is soon nauseated by Europeans. The bones are often deeply tinged with a greenish-yellow colour. Like other animals which feed on coarse vegetable substances, it is much infested by intestinal worms. The quills or spines are dyed of various bright colours by the native women, and worked into shot-pouches, belts, shoes, and other ornamental articles of dress.' (*Fauna Boreali-Americana.*)

Synætheres. (F. Cuv.)

Muzzle large and short; head convex in front; spines short; tail very long, naked at the end, and prehensile, like that of an opossum (Sarigue) or of a Sapajou; feet with only four toes, armed with claws.

Example, *Synætheres prehensilis; Hystrix prehensilis*, Linn.

Description.—Nose short and blunt; long white whiskers; beneath the nose a bed of small spines; top of the head, back, sides, and base of the tail covered with spines; the longest on the lower part of the back and tail, three inches in length, very sharp, white, barred near their points with black; adhere closely to the skin, which is quite naked between them; are shorter and weaker as they approach the belly; on the breast, belly, and lower part of the legs are converted into dark brown bristles; feet divided into four toes; claws very long; on the place of the thumb a great protuberance; tail eighteen inches long, slender, and taper towards the end; the last ten inches almost naked, having only a few hairs on it; has, for that length, a strong prehensile quality. (Pennant).

This appears to be the *Cuandu* (major) of Marcgrave and Piso; *Orico Cachero* and *Espinho* of the Portuguese; *Hoitzlacuatzin?* of Hernandez; the *Brazilian Porcupine* of authors.

Habits, Food, Geographical Distribution, &c.—The *Brazilian Porcupine* appears very much to resemble the *Canada Porcupine* in its habits, living in woods, sleeping by day, and feeding on fruits, &c. by night. Marcgrave states that its voice is like that of a sow. The quills are stated to have the same penetrating and destructive quality as those of the Canadian species. It is a sluggish animal, climbing trees very slowly, and holding on with its prehensile tail, especially in its descent. It grows very fat, and the flesh is said to be white and well-tasted. Our cut is taken from a living specimen in the garden of the Zoological Society, Regent's Park.

Synætheres prehensilis.

The genus *Sphigurus* appears to be founded on the *Coui* of Azara.

FOSSIL HYSTRICIDÆ.

Cuvier (*Ossemens Fossiles*, vol. v., part 2, p. 518) states that Mr. Pentland found in the Val d' Arno, near San Giovanni, in the same sandy beds which contain so many bones of large quadrupeds, a molar tooth exactly resembling that of a great porcupine, but which appeared to be fossil.

PORDENO'NE. GIOVANNI ANTO'NIO LICI'NIO, or LICINO, called *Il Pordenone*, was born at Pordenone in Friuli, in the year 1484. From the vigour of conception, the elevation of mind, and the style of execution which distinguish his works, it has been presumed, though it is not certain, that he frequented the school of Giorgione. Though on the whole inferior to Titian, he was his rival, and not always without success. He was an able colourist in oil, but chiefly excelled in fresco. As he principally painted frescoes in North or Upper Italy, he was known in Lower Italy only by his fine oil paintings. His most splendid work in oil is the altarpiece of Santa Maria dell' Orto, at Venice, representing a S. Lorenzo Giustiniani, surrounded by other saints, among whom are St. John the Baptist and St. Augustin. The frescoes of Pordenone are spread over the towns and castles of Friuli; some are at Genoa, Mantua, and Venice, but the best preserved are at Piacenza and Cremona. He was highly esteemed by the emperor Charles V., who ennobled him. Hercules II., duke of Mantua, called him to Mantua to paint cartoons for tapestry to be made in Flanders, but he soon afterwards died (in 1540), as it was suspected, of poison. It must be observed that he adopted the name of *Regillo.*

There are some of Pordenone's pictures in England:—at Hampton Court, a large rich picture of himself and family, and two other pictures; three in the collection of the late Sir Abraham Hume; in the Stafford collection, the Woman taken in Adultery, figures the size of life; at Corsham House a large picture of the Virgin and Child and St. Peter, ascribed to Titian, but which Dr. Waagen thinks to be by Pordenone; at Alton House (the earl of Shrewsbury's) a fine picture of the Death of Peter Martyr; at Burleigh House (the Marquis of Exeter's), 1, the Finding of Moses; 2, the Adoration of the Magi; the figures in both are whole length, the size of life. Dr. Waagen bestows high commendation on both pictures (the latter is erroneously ascribed to Bassano), and observes that he knows no other gallery that can boast of two such works of this master, whose pictures are so rare.

PORE. [SKIN.]

PORISM (πόρισμα). An intermediate class of propositions, between problems and theorems, was, as we are informed by Pappus, distinguished by the antient geometers under the name of porisms. Unfortunately however the only notices of them by the antients themselves, which are found in their remaining works, occur in the 'Collectiones Mathematicæ' of Pappus Alexandrinus, and the commentaries of Proclus on the Elements of Euclid, in both places so very imperfectly, that till of late years mathematicians were not agreed on their exact interpretation. The description of porisms by Pappus, which he gives in the preface to the seventh book of his above-mentioned work, in an account of Euclid's work on the subject, is, in all the manuscripts which have been examined, extremely mutilated, and every attempt to restore them, before the masterly hand of Robert Simson took up the subject, had completely failed. The first part of the description, which seems to be entire, is calculated only to excite curiosity, being too general for conveying any precise notion of these propositions, or for giving any effectual assistance for the recovery of them; and the remainder, containing a detail of the contents of Euclid's work, is through the whole so corrupt that all endeavours to explain it were nugatory. Several celebrated geometers indeed flattered themselves that they had obtained possession of the secret; but even Dr. Halley, with all his acuteness, relinquished the task, and adds, after giving the original, 'hactenus porismatum descriptio nec mihi intellecta nec lectori profutura.' The definition which Pappus quotes from the antients is too general to be useful, and perhaps implied more than our acquaintance with the language in which he wrote can enable us to determine. He says that a 'theorem is something requiring demonstration, a problem in which something is proposed to be constructed; but a porism, that which requires investigation;' and though this definition certainly does correspond to the nature of these propositions, yet it is deficient in discrimination, and of itself neither conveys any precise notion of Euclid's porisms, nor gives assistance in the investigation of any individual proposition. Dr. Simson's restored definition is as follows, literally translated:—'A porism is a proposition in which it is proposed to demonstrate that some one thing or more things are given, to which, as also to each of innumerable other things not given, but which have the same relation to those which are given, it is to be shown that there belongs some common affection described in the proposition.' The following less literal translation may probably be better understood:—'A porism is a proposition in which it is proposed to demonstrate that one or more things are given, between which and every one of innumerable other things not given, *but assumed according to a given law*, a certain relation described in the proposition is to be shown to take place.' Dr. Simson illustrates the propriety and accuracy of this definition by many examples, and it is so framed as to correspond with all the intimations of Pappus respecting porisms, and also with the character of the few individual porisms of Euclid which Dr. Simson had discovered. It may therefore justly be considered as expressive of the notions on this subject entertained by the antients, although probably, as in the cases of theorem and problem, no precise definition was given of porism. It has been objected to Simson's definition, that it may be inferred from it that a porism partakes more of the nature of a problem than a theorem, and consequently is inconsistent with the 'intermediate nature' mentioned by Pappus. In his enunciation it is affirmed that certain things *may* be found which shall have the relations or properties therein described. Now were it simply proposed to investigate certain things which would have the properties expressed in the porism, it may be regarded as a problem; but if these things are found by a construction described in the enunciation, the proposition becomes a theorem affirming the truth of the properties asserted; and then a demonstration only is required, without any investigation, in the manner which appears to have been practised by the later mathematicians alluded to by Pappus. The enunciation of a porism as a problem is not consistent with the usual character of such propositions. Problems usually, whatever difficulty may attend their solution, are almost immediately recognised, by those having some knowledge of geometry, as either possible in certain circumstances of the data, or as altogether impossible; and it would be unusual to propose as a problem 'to find things with certain properties, respecting the possibility of which no judgment can be formed without an analysis, or such consideration as is equivalent to an analysis.' For example, if it had been proposed as a problem in the time of Apollonius, to find in a given parabola a point having the property of the focus, that point being then unknown, such a proposition would not have been considered as a proper problem, but would in reality have been a porism. To take another example:—Proclus, in his wretched commentaries on the Elements, mentions the first proposition of the third book, 'to find the centre of a circle, as a porism, being in some measure between a problem and a theorem. But Proclus, however distinguished as a philosopher, was no mathematician, and as a circle, from Euclid's definition of it, must have a centre, the proposition to find that centre seems to be a proper problem. Had the circle been defined from another of its properties, as, for instance, from its being produced by the extremity of a straight line moving at right angles to another straight line, given in magnitude and position, and in the same plane, so that the square of the moving line be always equal to the rectangle by the segments into which it divides the given line; then the finding of the centre would be a proper porism, and might be enunciated thus:—'within a given circle (defined in the manner just mentioned) a point may be found from which all straight lines drawn to the circumference will be equal.'

Having thus placed before our readers the most probable restoration of the antient meaning of the term porism, we proceed to notice briefly what modern geometers have given us on the subject. First in importance stands the admirable paper on porisms by Professor Playfair, in the first volume of the 'Transactions of the Royal Society of Edinburgh,' which was read before that body, in July, 1784. He improves on Simson's definition, and substitutes the following:—'A porism is a proposition affirming the possibility of finding such conditions as will render a certain problem indeterminate, or capable of innumerable solutions.' This, it must be confessed, is an important and elegant simplification, and fully conveys every idea contained in the more prolix definition of Simson; but at the same time we agree with Dr. Trail in thinking that Dr. Simson's is expressed more nearly in the language and manner of the antient geometers:—'Though I admire the ingenuity and fully admit the soundness of this definition, and also the utility of the principle on which it is founded in the discovery of porisms, I must acknowledge my doubt of that particular notion of a porism having ever been adopted, or even proposed, among the antient geometricians.' (Trail's *Life of Simson*, p. 50, 51.) A paper on porisms, containing some examples in the higher geometry, by the present Lord Brougham, was inserted in the 'Philosophical Transactions of the Royal Society,' in 1795. Fryer has given a popular history of the discovery of porisms, in the last edition of Simson's Geometry. Lastly, the most complete exposition of them that has yet appeared may be found in the *Aperçu Historique sur l'Origine et le Développement des Méthodes en Géométrie*, 4to., Brus., 1837, by M. Chasles of Chartres, a member of the French Institute, and one of the most distinguished geometers in Europe.

Porism was also used by the Greek geometers to denote a corollary to a proposition, and the frequent use of the word in this sense, as well as in the other, by Pappus and Proclus, has occasioned much confusion. Proclus says that 'corollary is one of the geometrical appellations, but it has a twofold signification,' and he proceeds to describe, in a very obscure manner, the difference between the two meanings of the term.

See *Proclus in Euclidem*, edit. Hervagii, fol. Basil., 1533, fol. 18. We refer the reader also to Henry Savile's *Prælectiones in Euclidem*, 4to. Oxon., 1621, p. 18; and Trail's *Life of Simson*, p. 92.

PORITES. [MADREPORÆA.]

PORO'DRAGUS, De Montfort's name for a genus of Belemnites, arranged by M. de Blainville in the section characterised by a swollen apex, and being straightened near the base.

PORPHY'RIO. [RALLIDÆ.]

PO'RPHYRY was born A.D. 233, either at Tyre, whence he is called Tyrius, or at Batanæa (Basan), a town of Syria, whence he is called Bataneotes. His original name was Melech, the Hebrew and Syriac for king, a circumstance which occasioned Suidas to say that his real name was Basileus. His preceptor Longinus changed his Syriac name into Porphyrius (a man 'in purple,' the adornment of a king). While he was yet a boy, he repaired to Origen, the famous Christian writer, who was then probably living at Cæsarea in Palestine, certainly not at his native city

Alexandria, as Holstenius represents, following Vincent of Lerins. Whether Porphyry became the pupil of Origen, or how long he continued with him, is uncertain. He afterwards went to Athens, where for some time he studied under Longinus, the celebrated philosopher and critic. We find him next at Rome, where in the thirtieth year of his age he was a scholar of Plotinus, whose Life he has written, and in it he has stated some particulars concerning himself. After a few years he went to Lilybæum in Sicily, and dwelt there till after the death of Plotinus, A.D. 270, whence he is sometimes called Siculus. Here, according to Eusebius and Jerome, he composed his fifteen books against the Christians; which books, with more zeal than wisdom, were about a century afterwards ordered to be publicly burnt by the emperor Theodosius the Elder. Porphyry died at Rome, towards the end of Diocletian's reign, about A.D. 304.

Porphyry has been usually called 'the philosopher.' He distinguished himself as an acute and learned man, and wrote in the Greek language upon a great variety of subjects, in a simple and graceful style. It is to be lamented that he employed his talents in opposing Christianity; but it was mistaken policy to destroy any of his writings. Christians of modern times would have been able to turn the arguments of Porphyry to good account in further establishing the truth of their religion. Fabricius has given a list of Porphyry's works amounting to sixty-one, divided into three classes, published, unpublished, and lost: the last class consists of forty-three distinct performances. A neat edition of his 'Life of Pythagoras' and three other works was published at Cambridge in 1655, with the Dissertation of Holstenius on the life and writings of Porphyry subjoined. Others of his works have been printed at different times; but no complete edition of all that are extant has yet appeared. The four books 'On Abstinence from Animal Food' (*περὶ ἀποχῆς τῶν ἐμψύχων*) are one of Porphyry's best works, and contain a great deal of curious matter applicable to illustrate the history of philosophy. His 'Introduction to the Categories of Aristotle,' which is a useful little treatise, is prefixed to the editions of the 'Organon.' He wrote also a 'Commentary on the Categories of Aristotle' in question and answer, which was edited by Bogard, 1543, 4to. The Commentary of Porphyry on the 'Harmonica' of Ptolemy is printed in the collection of Wallis: unfortunately, only the first book and the first seven chapters of the second are extant.

One of the works of Porphyry, and a fragment of another enumerated among the lost, were discovered by Mai, in the Ambrosian Library at Milan, and published by him in 1816. The former is styled 'Ad Marcellam.' It seems that Porphyry had married Marcella, the widow of a friend who was a Christian, and that at the end of ten months, upon taking a journey, he addressed this little work to her. The fragment, which is in verse, belongs to a work in ten books, known by the name of 'De Philosophia ex Oraculis Libri.'

(Suidas, *Lexicon*; Holstenius, *De Vitâ et Scriptis Porphyrii Dissertatio*; Fabricius, *Bibl. Græca*; *British Critic*, vol. v., 1829.)

PORPHYRY. A large number of rocks of igneous origin, both very antient and comparatively modern, are thus designated, yet this use of the term is neither accurate nor convenient. Properly speaking, a particular structure is indicated by it, and not a definite rock or family of rocks.

Felspar of a granular texture, without crystals imbedded, is claystone; with imbedded crystals of felspar it is porphyry; hornblende mixed with uncrystallized felspar makes some greenstones; with imbedded crystals of felspar this becomes greenstone-porphyry. Hence, by this mode of designation, we have pitchstone-porphyry, greenstone-porphyry, basaltic-porphyry, felspar-porphyry, and even so vague a term as trap-porphyry; and, on the other hand, more correctly, porphyritic pitchstone, porphyritic claystone, porphyritic greenstone, porphyritic basalt, and porphyritic granite.

Among volcanic rocks porphyritic trachytes are common.

Fine examples of porphyry (crystals of felspar in a base of uncrystallized felspar) occur in Scotland at Inverara and in Ben Nevis, in Cumberland on Armboth Fell, and in Cornwall, commonly under the title of Eurite.

PORRI'GO, *Ringworm,* is a pustular and contagious disease of the scalp, or, in some rare cases, of other parts where there is much hair. M. Biett describes two varieties of it under the names of P. favosa and P. scutulata. Dr. Willan described many more varieties, but he included in this name other widely different diseases.

Porrigo favosa consists of an eruption of small flat yellow pustules, with depressions at their centres, distinct or clustered, and which soon concrete into bright yellow honey-coloured scabs, on the surface of which the depressions of the centres of each pustule are usually still visible. After some time the scabs become thick and white; and drying, split and break off. Sometimes however they remain long adherent, the skin beneath them ulcerating, and the discharge oozing through them. The hair of the parts affected is always much loosened, and often falls off spontaneously; and, when it grows again, is weaker and lighter in colour than before.

Porrigo favosa appears rarely in any part except the scalp. It affects persons of all ages; but especially children from six to ten years old, and those who are naturally unhealthy, or ill-fed and dirty. It is distinctly communicable by contagion, and by this means may affect alike the weak and the robust.

It is one of the most obstinate diseases of the skin, and often lasts for months or years. The first measure for its cure is to cleanse the head completely with poultices or soap and water, and to have the hair cut very close. The dead hair and scabs must then be cleaned off as fast as they form. The medicines that promise the speediest success are lotions with sulphuret of potash or slightly acidulated, or with alkalis or their carbonates, such as in the following forms:—ten grains of potassa fusa in an ounce of water, to be applied occasionally; one or two drachms of subcarbonate of potash in a pint of water, to be constantly applied on linen; or from one to three drachms of sulphuret of potash to a pint of water; or from ten to twenty drops of any of the mineral acids to a pint of water, also to be constantly applied. Lotions also of sulphate of copper, nitrate of silver, and of nearly all the stimulant and astringent salts, have been employed, and sometimes with success; and in most cases of the disease, all these will have to be tried in turn, till one, being found beneficial, is continued till the cure is completed, or till it has ceased to do good, when it must be changed for another. Internal medicines must be employed if there be any symptoms indicating their necessity; but generally they are useless.

Porrigo scutulata, which is more commonly termed *ringworm* than the preceding, appears in the form of circular red patches, with numerous minute yellow pustules with depressed centres, out of which a hair usually projects, and which are attended by great itching. The fluid contained in the pustules dries up soon after they are formed, and, by coalescing, they produce a scab over the whole diseased surface. Subsequently successive crops of new pustules form around the margin of the scab, which is increased by their drying, and thus the disease may spread over the greater part of the scalp by the meeting and coalescing of the patches, which were at first isolated. The hair usually falls off from the part affected, or is so loosened that it may be pulled out without pain.

This form of porrigo sometimes appears spontaneously in poor and dirty children, but it is usually produced by contagion. The suggestions for its treatment must be the same as for Porrigo favosa.

PORSE'NA, or **PORSE'NNA,** a Lar (or mighty lord) of the Etruscan town of Clusium, with whom we are made acquainted in the early history of Rome. When the Tarquins, in the second year after their expulsion (508 B.C.), had been defeated near the forest of Arsia, they sought, as we are told, the assistance of Lar Porsena. (Liv., ii. 9.) According to Livy, the Etruscan prince immediately marched with his army against Rome, which was thrown into the greatest consternation. The Tarquins themselves however are entirely lost sight of in the narrative of the events which ensued. Porsena appeared with his overwhelming forces before the Janiculum, and the Romans, who had fortified themselves here, fled back to the Tiber. The defence of the bridge (Pons Sublicius) was entrusted to Horatius Cocles, who bade his companions retreat across the bridge and break down the part behind him, while he resisted the hosts of the Etrurians at the western end. His request was obeyed, and when the bridge was broken down, Horatius, after having prayed to father Tiberinus, threw himself into the water, and swam across amidst the darts of the enemy. Porsena, having thus failed in his attack, laid siege to the city, garrisoned the Janiculum, and pitched his camp on the banks of the river. The Romans at first kept within the city, and drove all their cattle within the walls. But the consuls P. Valerius and T. Lucretius devised a stratagem by which the Etruscans were drawn into a snare and suffered great loss. The siege however continued, and Rome suffered from famine. A Roman youth of noble birth, C. Mucius, who was indignant at the sufferings of his countrymen, went, with the approbation of the senate, across the Tiber with the intention of killing the invading king. Disguised and armed with a dagger, he found his way into the tent of Porsena, but mistaking the secretary of the king for the king himself, he killed him. Being seized by the king's attendants, he frankly declared his intentions, and added that he was not the only Roman youth that aimed at the king's life. Upon this the king threatened to burn him alive, unless he revealed his associates. But Mucius, to show to the king that he did not fear bodily suffering, thrust his right hand into a fire which happened to be burning upon an altar. The king, admiring the intrepidity of the young man, ordered him to be removed from the altar, and gave him his liberty. Mucius then told the king that there were three hundred noble Romans who had bound themselves by an oath to kill him, and that it had been his lot to make the first attempt. Upon this Porsena offered peace to the Romans on condition that they should give back to the Veientines their territory; the Janiculum was also evacuated upon the delivery of hostages. Porsena returned to Clusium, leaving to the famished Romans his well-stored camp.

The inconsistencies and incongruities of this story have been pointed out by Beaufort and Niebuhr. We have however several statements from which we may gather some glimpses of the real course of events so much disfigured in the narrative of Livy. Tacitus (*Hist.*, iii. 72) says that the city was taken by Porsena, a fact which at once throws light upon the whole transaction. From Pliny (*Hist. Nat.*, xxxiv. 39) we learn that the Romans were prohibited by Porsena from using iron for any other purpose than agriculture; and another proof of the entire submission of Rome to the foreign conqueror is implied in the story (Dionys. Hal., v. 35) that the senate sent to him an ivory throne and other insignia of royalty. These circumstances place it beyond doubt that for a time the Etruscan king was master of Rome. In the Roman tradition the truth is entirely distorted, and the whole affair between the Romans and Porsena is represented as a series of generous and magnanimous actions on both sides.

After Porsena had left Rome with his hostages, consisting of a number of maidens and youths, Cloelia, one of the maidens, effected her escape at the head of her female companions. The Romans, faithful to their treaty, sent her back, but the king, no less generous than the Romans, not only gave her liberty, but allowed her to select from the young male prisoners all those whom she might wish to restore to freedom. The accounts in Dionysius (v. 33), Plutarch (*Publ.*, 19), and Pliny (*Hist. Nat.*, xxxiv. 13), are somewhat inconsistent with one another. After his return to Clusium, continues the legend, Porsena sent his son Aruns with an army against Aricia, then the principal town of Latium, that it might not appear as if his former campaign had been entirely useless. The fact however seems to be, that being in possession of Rome, he wished to make himself master of all Latium. The Aricines were at first dismayed, but they asked and obtained aid from other Latin towns, and from Cuma in Campania, and thus gaining fresh confidence, they ventured on a battle. But the first attack of the Etruscans was so violent that the Aricines themselves were put to flight; the Cumans however attacked the enemy from behind, and defeated him. Aruns fell, and with him the greater part of his army. Those who escaped sought a refuge at Rome, where they were kindly received, and a district (Vicus Tuscus) was assigned to those who wished to settle there. It was not until this event that Porsena, according to the legend, sent envoys to Rome for the purpose of restoring the Tarquins to their country. But receiving for answer, that the liberty which Rome had once gained could only cease with the existence of the city, and that she would throw open her gates rather to an enemy than to Tarquin, he did not urge his demand, sent back those hostages who were still in his possession, and restored to the Romans the district of the Veientes, which had been taken from them by the treaty of the Janiculum. The peace between Porsena and the Romans was never interrupted, and from this moment we lose sight of the Etruscan king in the history of Rome. It is highly probable that he retained the sovereignty of Rome till the defeat at Aricia, when the Romans seem to have regained their independence. It must therefore have been after this event that the property of the king which was found in the city was publicly sold. This sale gave rise to the symbolical custom of selling the goods of King Porsena, which continued down to the time of Livy (ii. 14).

Porsena was probably a fabulous hero of the Etruscans, belonging to an age much anterior to any of which we have historical records. The Roman legends however have interwoven his name with the war against the Etruscans which the Tarquins are said to have caused soon after their expulsion. How little Porsena belongs to real history may be concluded from the fabulous account of his monument, a building as inconceivable as any described in the 'Arabian Nights.' (Niebuhr, *Hist. of Rome*, i., note 465, compared with p. 551.)

PORSON, RICHARD, was born at East Ruston, Norfolk, on the 25th of December, 1759. His father, Mr. Huggin Porson, who was the parish-clerk of his native place, taught him reading and writing at the same time, by drawing letters on a board or on the sand, and making the boy pronounce the corresponding sound and imitate the figure which expressed it. He also taught him to solve questions of arithmetic without the help of a slate or a copy-book, and thus laid the foundation of that extraordinary memory for which Porson was afterwards so celebrated. At nine years of age Richard Porson was sent, together with his younger brother Thomas, to the village school, kept by Mr. Sumner, an excellent writing-master, to whom Porson was indebted in some measure for his beautiful hand-writing. He stayed three years at this school, when his abilities and diligence attracted the observation of Mr. Hewitt, the vicar of the parish; from this gentleman Porson and his brother Thomas received gratuitous instruction in Greek and Latin for about two years, and the progress of the elder brother was so astonishingly rapid that he was mentioned to all the neighbouring gentry as a village prodigy. One of them, Mr. Norris of Grosvenor Place, was induced to send for Richard Porson, and after examining him in the closest and most rigorous manner, very liberally sent him to Eton, where he was placed on the foundation, at his own expense, in August, 1774. Porson was then in his fifteenth year, and he remained at Eton just three years, respected and admired by all who knew him. The death of his patron Mr. Norris fortunately did not affect his prospects: for Sir George Baker, the eminent physician, and some other friends of his late benefactor, collected a small income for him, which enabled him to continue at Eton, and he was afterwards sent to Trinity College, Cambridge, under the same kind patronage, in 1777. According to Dr. Goodall, late provost of Eton College, Porson knew little Greek when he went to Eton, and his compositions while at that school, though very correct, fell far short of excellence, and were very inferior to those of several of his contemporaries. He was placed as high in the school as he could be, but he was not elected to King's College, Cambridge. However, when he left Eton, contributions were readily supplied by Etonians in aid of Sir George Baker's proposal to secure the funds for his maintenance at the University. (*Minutes of Evidence before Select Committee on Education of Lower Orders*, 1818.)[*] At Cambridge he maintained and increased the reputation which he brought with him from Eton. In 1781 he was elected to a university scholarship on Lord Craven's foundation, one of the greatest honours within the reach of an under-graduate; and on taking his degree in the following year, he was third senior optime in mathematics and senior medallist in the classical competition which followed. He was elected a fellow of his college in October, 1782, being one of the very first who ever obtained that distinction in the year of his B.A. degree. Some scruples which he felt with regard to the subscription of the Thirty-nine Articles deterred him from taking orders, and, according to the rules of the college, he consequently vacated his fellowship in 1791, and was thus again left unprovided for. His friends however again came forward to support him, and in 1793 he was elected Regius Professor of Greek in the university of Cambridge; the small salary attached to this office, and an annuity of 100*l.* for life, which Mr. Cracherode and some other liberal friends had purchased for him, removed him from the pressure of immediate want, and it is thought that he would have added to his income by delivering lectures to the university had there not been some obstacle to his obtaining rooms in Trinity College, where he wished to reside.

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[*] King's College, Cambridge, consists of a provost and seventy fellows and scholars. Vacancies occur among the latter through death, marriage, and presentation to a King's living. But as the number of seventy must always be kept up, as soon as there is a vacancy, the senior colleger at Eton is immediately sent to Cambridge. He remains for three years a scholar, after which he is admitted to his fellowship and B.A. Every year, at election, in the end of July or beginning of August, the provost of King's, accompanied by two Posers, comes to Eton. The senior collegers are then examined, and a certain number of them, about twelve, are placed on the indenture. These boys go off to King's in succession, that is, in the order in which they stand on the indenture, whenever, in the course of the year, a vacancy, which at Eton is called a resignation, occurs at King's. If the number of boys on the indenture exceeds the number of vacancies which have occurred in the course of the election year (from August to August), those who remain are superannuated, unless they have not attained the age of nineteen on Election Monday, in which case they are allowed a second chance. This was the case with Porson; he was superannuated. When he was admitted on the Eton foundation he was placed, as Dr. Goodall says, as high in the school as he well could be; but he did not reach the sixth form in time, so as to be placed on the indenture at the proper age. The examination of the Posers merely went to ascertain that the senior boys had a sufficient knowledge to qualify them to be admitted to King's, in the case of a vacancy. They were not brought into competition with each other by the Posers; their qualifications being proved (and the standard was a low one), they were placed on the indenture, exactly in the same order as that in which they stood on the Eton list. Indeed it seldom happened that a boy on the foundation lost places in his progress through the school. A lad well placed,

In 1795 Porson married Mrs. Lunan, a sister of Mr. Perry, editor of the 'Morning Chronicle.' Unfortunately this lady died about two years after, and the effect of her loss upon Porson's mind seems to have produced those habits of intemperance to which, as is too notorious, this great scholar was much addicted in the latter part of his life. Mr. Perry however continued to be the warmest friend that Porson possessed, and his time was from henceforth generally spent either at the 'Morning Chronicle' office or at Mr. Perry's country-house at Merton.

On the establishment of the London Institution, Porson was appointed head librarian at that establishment, with a salary of 200*l.* a year, and was of great service in selecting a classical library. It was not however a sufficiently wide sphere of action for such a man as Porson, and it is to be regretted that he never was employed in any public situation equal to his abilities, and likely to have called forth the energies of his mind. During the last years of his life he suffered much under a complication of disorders, produced partly by his irregular habits, and partly by his aversion to medical advice. In 1808 his prevailing disorder was asthma, which was succeeded by intermittent fever. On Monday, the 19th of September, he was attacked by apoplexy, in the street, and he had another attack on the following day. He lingered till the Sunday following (25th September, 1808), when he expired. His remains were conveyed to Cambridge, and solemnly interred in the antechapel of Trinity College, where a monument has been raised to his memory, and a bust by Chantrey has been erected.

Richard Porson was one of the profoundest Greek scholars, certainly the greatest verbal critic, that any age or country has produced. He possessed every quality which is considered necessary to the formation of a classical scholar. A stupendous memory, unwearied application, great acuteness, strong sound sense, and a lively perception both of the beautiful and of the ridiculous. Besides these qualifications, he enjoyed the rare faculty of guessing or conjecturing, from the imperfect data of corrupt readings, the very words of the author whose text he sought to restore; in this last particular we know of no one, with the single exception of Bentley, who can be named in comparison with him; and in some points we should not hesitate to place Porson before that great Aristarchus of criticism. It is a common mistake to suppose that Porson's reading was confined to the Greek poets, or did not extend much beyond the ordinary range of classical authors. We doubt if there was any classical author whom he had not read, and we are confident that he was familiar with the whole mass of Greek literature. We have looked through the editions of Greek books which belonged to him, and which are now in the hands of different individuals or in public libraries, and there is not one which does not bear some trace of his careful and critical perusal. He was besides an excellent French scholar, and was well versed in the literature of his own country. His English style was terse and elegant, and his 'Letters to Travis' convince us that he would have held a high place among English writers if he had directed his attention to the more popular branches of literature. From some traces which we have observed here and there, we are disposed to believe that Porson would have been a great general philologer had he lived some years later, and had an opportunity of turning his attention to the linguistic studies of modern scholars. As it was, he paid some attention to Anglo-Saxon, and it was perhaps only from want of means that he did not apply himself to a wider range of comparative philology. The great complaint which we have to make against Porson is, that with such vast capabilities he did so little. With the exception of reviews and other fugitive essays, he published nothing himself besides the 'Letters to Travis,' just mentioned, and a critical edition of four plays of Euripides. His edition of the Lexicon of Photius [Photius], and his 'Adversaria,' were published after his death. Perhaps however we should have no right to complain of this, if it were not for the consequences which have sprung from it. Porson's great reputation during his lifetime converted all the promising young scholars of the time into servile imitators of the great critic, and the 'Porsonian school of critics,' as they have been termed, threw many impediments in the way of sound and comprehensive scholarship. Every one was inventing some new canon, and then altering the text of Greek poets accordingly, to suit his own rule. It is not possible in this place to enter at length on such a question as this; but most Greek scholars will, we think, admit that much harm, or at least little good, has resulted from this close and narrow imitation of Porson; and that it would have been better if his successors had endeavoured rather to do what he omitted to do, but might have done, than to confine themselves to the narrow limits of his actual performances.

PORT GLASGOW. [Glasgow.]

PORT LOUIS. [Morbihan.]

PORT MAHON. [Menorca.]

PORT ROYAL. [Jamaica.]

PORT ROYAL DES CHAMPS, a celebrated convent of nuns, which was situated not far from Versailles, on the left of the high road leading from Rambouillet to Chartres. The site of the convent is a deep vale, enclosed by hills. In the antient charters the place is called Porrigium, Porregum, Portus Regius, Porrois, and Porréal. The name dates from the time of Philippe Auguste, about the beginning of the thirteenth century, who having once lost his way while hunting, found in this sequestered valley a shelter, 'port,' for himself and his attendants. The monastery was founded about 1204, with a donation made by Matthieu de Marli, of the family of Montmorency, when he was going to set out for the Holy Land. The nuns were of the order of St. Bernard, and had their own abbess. In 1223 the pope conferred on the convent the right of affording an asylum to such lay personages as, being disgusted with the world, and being their own masters, should wish to live in monastic seclusion without binding themselves by permanent vows. By a papal bull, the nuns had the right of choosing their abbess without any interference on the part of the bishop of the diocese.

The important period of the history of Port Royal begins with the appointment of Angelica Arnauld, sister of the famous controversialist Antoine Arnauld. Angelica was a mere child when she was appointed, through family interest, to be coadjutrix of the abbess Jeanne de Boulehard, about the year 1600. In 1602 Boulehard died, and Angelica, then not quite eleven years old, was consecrated abbess. She was of course assisted in the exercise of her office by the older nuns. As she grew to womanhood, she conceived the plan of a reform in the discipline of the convent, which had grown rather loose, and she carried it into execution. The leading features of this reform were a community of goods, absolute silence, abstinence from meat, rigid seclusion, ascetic exercises, and the infliction of penitential mortification. In 1626 Angelica removed with her nuns to a house in the Fauxbourg St. Jacques at Paris, on account of an epidemic which raged at Port Royal des Champs, and which was attributed to the dampness and unhealthiness of that district. In 1633 a new and more spacious house was purchased for the monastic establishment at Paris, in the Rue du Boulai near the Rue Coquillière, and the church was consecrated by the archbishop of Paris with great solemnity

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according to age and number, on the lower forms of the school, was pretty sure of being sent to King's College, after a lapse of eight, ten, or even twelve years, if his conduct was respectable. A great change has lately taken place in this respect. The foundation boys are not only brought into competition with each other and the Oppidans, but they gain or lose places, according to merit, on their taking steps. The senior boys, who are brought before the Posers, are in future to be considered as having no place, and are to be registered on the final indenture, according to their merit, after a strict examination.

The new convent was called Port Royal de Paris. The building of Port Royal des Champs, which continued to belong to the same monastic institution, was occupied afterwards by several pious and learned men who wished to live a secluded life according to the spirit of the papal bull of 1223, and who were styled 'les Solitaires de Port Royal.' This was the origin of the famous school of Port Royal. One of the first of these recluses was Claude Lancelot, the grammarian. He was joined by Antoine le Maistre, a distinguished advocate, and his brother Louis Isaac le Maistre de Sacy, by Antoine Arnauld, brother of the abbess Angelica, by Pierre Nicole, Nicolas Fontaine, Thomas du Fossé, and others. [ARNAULD, ANTOINE.] They were most of them friends and disciples of Du Verger d'Hauranne, abbot of St. Cyran, well known for his controversies with the Jesuits, and his connection with Jansenius, who had been his school-fellow at Louvain. Le Maistre de Sacy was for a time spiritual director of the nuns of Port Royal de Paris. Lancelot and his friends established a school at Port Royal des Champs for the better religious, moral, and scholastic instruction of a limited number of pupils. They objected above all to the lax morality of the Jesuits, and to their method of education, which admitted no improvement. The school of Port Royal consisted of five classes of five pupils each. Lancelot, Arnauld, De Sacy, Nicole, Fontaine, and others were the teachers, and they published in concert a number of school-books which have ever since maintained a reputation. The school of Port Royal flourished from 1646 to 1660. It formed many distinguished pupils; Racine and Tillemont were of the number. Among the school-books that were published for the use of that institution the following deserve especial mention: 1, 'Nouvelle Méthode pour apprendre la Langue Latine.' 2, 'Nouvelle Méthode pour apprendre la Langue Grecque.' 3, 'Jardin des Racines Grecques.' 4, 'Grammaire Générale.' 5, 'Elémens de Géométrie.' All these works were written conjointly by Lancelot, Arnauld, and Sacy.

In the mean time the number of nuns and novices of Port Royal de Paris having greatly increased, the abbess Angelica Arnauld determined upon transferring part of them to Port Royal des Champs. Upon this the school of Port Royal was removed from the latter place to Paris, Rue St. Dominique, Fauxbourg St. Jacques, but after three years the teachers were restored to Port Royal des Champs, where they no longer occupied the monastic building, but a farmhouse, called Les Granges, on the neighbouring hill.

In 1653, Pope Innocent I. having condemned five propositions in the book of Jansenius [JANSENISTS], Arnauld wrote to prove that these propositions did not exist in the book of Jansenius, at least not in the sense attributed to them. Upon this Arnauld was accused of Jansenism, and strange to say, the nuns of Port Royal, with their abbess Angelica, took part in this controversy, and declared that they could not see the five alleged heretical propositions in the work of Jansenius. At last an order came from the king, in 1660, to suppress the school and drive away the boarders from Port Royal des Champs. The nuns continuing refractory, Perefix, archbishop of Paris, sent a party of police-officers, in 1664, who arrested the abbess, the prioress, and other nuns, and distributed them among several monasteries, where they were kept in a state of confinement. Meantime some of the nuns who had remained at Port Royal de Paris intrigued with the government in order to become independent of Port Royal des Champs, and Louis XIV. appointed a separate abbess to Port Royal de Paris. In 1669 a compromise was made between the pope and the defenders of Jansenius, which was called 'the peace of Clement IX.' The nuns of Port Royal des Champs with their own abbess were then restored to their convent, but Port Royal de Paris was not restored to them; a division of property was effected between the two communities, by order of the king, which was confirmed by a bull of Clement X. dated 1671. Each convent retained its own abbess. Several disputes took place between the two communities, in which the archbishop of Paris and the Jesuits took an active part.

At last, in March, 1708, a bull of Pope Clement XI. suppressed the convent of Port Royal des Champs and gave the property to Port Royal de Paris. (*Lettres des Religieuses de Port Royal des Champs au Pape, au Roi, et à Messieurs les Cardinaux de Noailles et d'Etrées touchant les Bulles de notre Saint Père le Pape Clément XI. du 27 Mars, 1708, portant suppression du titre de l'Abbaye de Port Royal des Champs et union des biens qui en dependent au Monastère de Port Royal de Paris.*) In 1709 D'Argenson, the lieutenant-de-police of Paris, was sent with a body of men to Port Royal des Champs, and he removed from thence the nuns, who were distributed among several convents. The convent and church of Port Royal des Champs were stripped of all their valuables, which were transferred to Port Royal de Paris, and the former building was levelled with the ground, by order of Louis XIV., as a nest of Jansenists and heretics. Gregoire has written a work styled 'Les Ruines de Port Royal,' 1809, in which he describes the present appearance of the place. Besoigne, Racine, Clémencet, Du Fossé, and others have written Histories of Port Royal. Dr. Reuchlin has lately published an elaborate 'Geschichte von Port Royal,' Hamburg, 1839.

The most distinguished men of learning connected with Port Royal are—1, Claude Lancelot, born at Paris in 1615. He was a disciple of Du Verger d'Hauranne, came to Port Royal in 1638, and was one of the founders and promoters of the school. After its dispersion, Lancelot acted as preceptor to several young noblemen in succession; he afterwards retired to the convent of St. Cyran, which being suppressed in 1678, on suspicion of Jansenism, Lancelot was sent into exile at Quimperlé, where he died in 1695. Goujet, in his edition of the 'Mémoires de St. Cyran, par Lancelot,' gives a biographical notice of the latter, and a list of his works. 2, Louis Isaac le Maistre de Sacy was also a disciple of Du Verger d'Hauranne, took priest's orders, and withdrew to Port Royal, where he became spiritual director to the nuns, and gave up his property to the monastery. In 1661 he retired to Paris with his friends Nicolas Fontaine and Thomas du Fossé. In 1666 they were all three arrested, and confined to the Bastille, where Le Maistre remained three years. During his confinement he began his translation of the Bible: 'La Sainte Bible,' in Latin and French, with explanations, which was completed after his death by Du Fossé. He also translated Terence and Phædrus into French, and wrote other works in French, both in prose and verse. He returned to Port Royal in 1675, but was ordered by the government to quit it in 1679, when he went to live at the house of his cousin the marquis of Pomponne, where he died in 1684. His brother Antoine le Maistre had died before him at Port Royal des Champs. He wrote several controversial works. 3, Pierre Nicole, born at Chartres in 1625, studied at Paris, and afterwards became one of the professors in the school of Port Royal. In 1655 he returned to Paris, where he contributed to Pascal's work, 'Les Lettres Provinciales.' [PASCAL.] Persecuted on the score of Jansenism, he took refuge in Belgium, but afterwards returned to Paris, where he published his 'Essais de Morale,' which established his reputation as a writer and as a moralist. He also published—1, 'Epigrammatum Delectus ex omnibus tum veteribus tum recentioribus Poetis,' Paris, 1659; 2, 'La Perpetuité de la Foi de l'Eglise Catholique touchant l'Eucharistie,' 1664, against Claude, the Calvinist divine; 3, 'De l'Unité de l'Eglise,' being a refutation of Jurieu, another Calvinist divine; 4, 'Etudes de Morale et Instructions Theologiques,' and other religious works.

PORT, a Portuguese wine, the produce of the vineyards of the Upper Douro. For several centuries, and more particularly after the Conquest, the wines of France were almost the only kinds imported into England. In 1669 the consumption of those wines in England amounted to two-fifths of the whole quantity imported, the duty at that time being the same on the wines of France and Portugal. A distinction was made in the duties in 1693, and a higher rate was levied upon French wines. In 1697 the duty on French wines was again increased, and they were charged at the rate of 4*s.* 0½*d.* per gallon, while the duty on Portuguese wine was only 1*s.* 8*d.* In 1703 a treaty between England and Portugal was negotiated by Mr. Methuen, by which we engaged to admit Portuguese wines at a duty of one-third less than that on French wines, Portugal being bound to receive English manufactured goods at one-half less duty than that levied upon the manufactures of other countries. From this time the fiscal difference of the tariff has been at all times so great, often amounting to 100 per cent., as completely to alter the national taste, and the wines of the Upper Douro have been those chiefly consumed in England. From 1707 to 1779 the proportion of French and Portuguese wines imported was 5 per cent. of the former, and 95 per cent. of the latter. In 1784, of the total quantity of every description of wine imported, the proportion was 80 per cent. of Portuguese wines, and 20 per cent.

of those from all other countries: in 1790 the proportion continued much the same, being 77 per cent. and 23 per cent., and of the latter proportion 18 parts out of 23 consisted of Spanish wines. The Portuguese monopolists of course treated their customers as all monopolists do, charging an extravagant price for their wines, and attending but little to the improvement of their quality. On the establishment of the Oporto Wine Company in 1754, the extent of the vineyards was diminished with a view of making the most of their privileges at the least possible trouble. To this system England submitted until within a comparatively recent period. In 1782 Portugal agreed to admit other articles coming from England besides her manufactures at a duty of one-half per cent. less than was paid by other countries; but England was the only customer for Portuguese wines, and, with the exception of Brazil, they scarcely found their way into any other country. The following table, exhibiting the total quantity of wine exported by the Oporto Company, distinguishing the quantity sent to England, is given on the authority of a note in No. 3 of the 'Foreign Quarterly Review':—

Years.		Total Quantity exported.	To England.
1818	.	32,843 pipes.	32,465 pipes.
1822	.	27,758 „	27,470 „
1825	.	40,254 „	40,277 „
1826	.	18,604 „	18,310 „

The natural taste and quality of the wines of the Upper Douro are unknown in England, and probably would not be relished. They are strongly flavoured for the English market, and require to be kept some years in the wood and in bottle before they attain the qualities which render port-wine a favourite beverage with wine-drinkers in England.

In 1819 a reduction was wisely made in the duty on French wines, with the best effects upon the revenue, besides the advantage of promoting a commercial intercourse with France; and in 1831 this improvement in our commercial policy was followed by an act equalising the duty on all foreign wines. This has induced Portugal to revise her tariff, and the imports from England are now placed upon the same footing as those from other countries. The change was made in April, 1834, and an account of it is given in a parliamentary paper printed in the same year (No. 318). In the following month the privileges of the Oporto Wine Company were abolished; but they have since been restored. At all events the wine-trade with Portugal does not now depend upon high duties directed against the wines of other countries, although it will for a long period be sustained by the taste which they have tended to create. The consumption of French wines will probably increase, and the new commercial treaty with France, which Mr. Porter, of the Board of Trade, proceeded to Paris with full powers to sign during the present month (September, 1840), will have a more extensive influence upon the trade of the two countries. The following tables exhibit the extent of the wine-trade with Portugal during the last twenty years.

1. Quantities of wine annually imported into the United Kingdom from Portugal on an average of each of the five years ending 1824, 1829, 1834, and 1839; also quantities of the same exported from the United Kingdom for the same periods:—

Average of Years.		Imported.	Exported.
1820-1-2-3-4	.	2,822,061 galls.	205,749 galls.
1825-6-7-8-9*	.	3,558,252 „	240,933 „
1830-1-2-3-4	.	2,784,545 „	245,185 „
1835-6-7-8-9	.	3,491,684 „	320,017 „

2. Duties: Years in which alterations were made in the duties on Portuguese, Spanish, and French wines, and rate of the same per gallon:—

Years.			Portuguese and Spanish.		French.	
			s.	d.	s.	d.
1820	.	.	9	1¼	13	9
1825	.	.	4	9¾	7	2½
1826	.	.	4	10	7	3
1831	.	.	5	6	5	6

3. Proportion per cent. of the consumption of the principal kinds of wine consumed in the United Kingdom at different periods:—

Years.	Portuguese.	Spanish.	French.	Madeira.	Cape.
1820 to 1824	50·9	21·8	3·6	7·2	11·5
1825 to 1830	47·	28·2	5·7	4·1	9·2
1831 and 1832	43·	34·2	4·	3·	8·7
1838 and 1839	41·5	36·	5·7	1·6	7·5

The consumption of wine is less than it was half a century ago, notwithstanding the increase of the population in wealth and numbers. [Wine-Trade.] This has not arisen from the increased consumption of malt liquor [Malt], but from the great increase in the use of British spirits. [Spirit-Trade.]

4. Quantities of Portuguese wines retained for home consumption in each of the following years, showing the proportion per cent. to the total quantity of all kinds on which duties were paid for consumption:—

Years.	Gallons.	Proportion per Cent.	Years.	Gallons.	Proportion per Cent.
1820	2,361,461	51·4	1830	2,869,608	44·5
1821	2,343,509	50·	1831	2,707,734	43·6
1822	2,375,210	51·3	1832	2,617,405	46·7
1823	2,492,212	51·4	1833	2,596,530	41·8
1824	2,512,343	49·9	1834	2,780,303	42·
1825	4,200,719	52·4	1835	2,780,024	43·4
1826	2,833,688	46·7	1836	2,878,359	42·2
1827	3,222,192	47·1	1837	2,560,252	40·
1828	3,307,021	46·1	1838	2,900,457	41·4
1829	2,682,084	43·1	1839	2,998,152	41·4
Average	2,833,043	49·0	Average	2,768,882	43·0

5. Quantities of Portuguese wines warehoused under bond in the United Kingdom on the 5th of January in each of the following years. It may be observed that the increased quantity bonded may be solely occasioned by additional facilities for bonding:—

Years.	Port of London. Galls.	Other Ports. Galls.	Total. Galls.	Total all Sorts. Galls.
1833	1,442,868	1,312,572	2,755,440	7,975,897
1834	906,335	1,187,835	2,094,170	7,526,967
1836	2,397,186	1,819,718	4,216,904	9,776,140
1837	2,902,735	2,081,165	4,983,900	10,568,319
1838	2,838,617	1,997,766	4,836,383	10,727,447
1840	2,768,956	1,997,553	4,766,509	11,233,744

PORTA, GIAMBATISTA, was born of an antient and noble family at Naples, about the year 1550. He applied himself very early to the study of nature, and was deeply read in Aristotle, Pliny, and all the antients who in any way treat of nature or describe the earth. It is said that at the age of fifteen he composed the first books of his 'Natural Magic;' but as he derived his opinions from such authors as Arnold de Villanova and Cardan, he mixed up numerous fantastic and delusory notions with the deductions of real science. It appears from his writings that he travelled through Italy, France, and Spain, visiting all the libraries and learned men, and conversing with artists on matters relating to their several professions. His publications widely extended his fame. A suspicion of his being addicted to unlawful superstitions, countenanced by some of his works, was however the cause of his falling under the censure of the court of Rome, which obliged him to appear there in person to justify his conduct and opinions. The result of the examination was the prohibition of the meeting of any more of the literary assemblies held at his house, on account of their being accused of having occasionally discussed the secrets of magic. This society was called 'I Secreti,' and was accessible only to such as had made some new discoveries in physical science: even after its dissolution his house still continued to be the resort of literary men, both foreign and Neapolitans. He not only established private schools for particular sciences, but to the utmost of his power promoted public academies, and had no small share in establishing that of 'Gli Oziosi' at Naples. In his old age he composed dramas, both tragic and comic, which had some success at the time, but are now quite forgotten. He died, unmarried, at Naples, February 4, 1615, and was buried in a white marble chapel that he had built in the church of St. Laurence.

In spite of the strange and childish absurdities that abound in Porta's works, it cannot be denied that he was of greater service to physical science than perhaps any of his contemporaries. It is to him that we owe the invention of the camera obscura, and also of a great number of curious optical experiments. He has written much on the subject of plane, concave, and convex mirrors, and particularly on the burning-glass, which he flattered himself he could construct in such a manner as to be able to burn at any distance. The most important invention that has been attributed to him is that of the telescope, of which he has by some persons been supposed to be the author, on account of a passage in the tenth chapter of the seventeenth book of his 'Natural Magic;' but by the best judges this honour is still considered to be due to Galileo. [GALILEO.]

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* The importations of the year 1825 exceeded by 2,130,065 gallons the annual average quantity imported in the preceding quinquennial period.

The following is a list of his extant works:—1, 'Perspectiva,' Rome, 1555, 8vo.; 2, 'Magiæ Naturalis, sive de Miraculis Rerum Naturalium, Libri Viginti,' of which the first complete edition was published at Naples, 1589, fol. The Naples edition of 1558, fol., is very rare, and contains only three books; that of Antwerp 1561, 8vo., contains four. It has been often reprinted, and translated into several modern languages; into English, for instance, so late as 1658. This work contains a great number of curious facts that were not generally known at that time concerning the properties of plants, metals, animals, &c.; and also the most remarkable human inventions. It is a vast compilation of passages extracted from authors both antient and modern, and put together without taste or judgment; but it contains a great number of interesting observations on light, mirrors, telescopes, fireworks, statics, mechanics, &c. 3, 'De Furtivis Literarum Notis, vulgo de Zifaris,' Naples, 1563, 4to., several times reprinted, with the addition of a fifth book. This is a sort of stenography, or rather a treatise on different modes of secret writing, of which one hundred and eighty are explained, and a method proposed by which they can be multiplied ad infinitum. 4. 'Phytognomonica Octo Libris Contenta, in quibus nova facillimaque affertur Methodus quâ Plantarum, Animalium, Metallorum, Rerum denique omnium ex primâ extimæ Faciei Inspectione quivis abditas Vires assequatur. Accedunt ad hæc confirmanda, Infinita propemodum Selectiora Secreta, summo Labore, Temporis Dispendio, et Impensarum Jacturâ, vestigata explorataque,' Naples, 1583, fol., and several times reprinted. His object in this work is to point out the means of discovering the properties of plants by their analogy with the different parts of the body of animals. It is, as might be anticipated, full of absurdities, though Adanson calls it an ingenious system, and says that the work contains at least as much truth as falsehood. (*Familles des Plantes*, préf. xi.) 5, 'De Humanâ Physiognomoniâ,' Sorrento, 1586, fol.; and in Italian, Naples, 1598, fol., very frequently reprinted, and translated into different modern languages. This is the work by which he is best known, and which gives him a right to be considered as the true founder of physiognomy. After establishing the influence that the mental affections exercise upon the body, he treats of the differences of each part of the human frame, and declares the signs which disclose the character of the individual. He has made great use of the observations of Aristotle, Polemo, and Adamantius; but he has also added a great many curious remarks of his own. He considers that the human face should be compared with that of animals; that as there exists in the human race as many modifications as there are individuals, and as also the different degrees of his organization recall those at which nature stops permanently in some of the inferior vertebrated animals, the general configuration of the head of man must express a character akin to that which is found in these same animals, according as the intellectual dispositions of the individual agree with those that characterise them. Accordingly, in the plates inserted in his work, he has compared the head of Vitellius with that of an owl, Plato's with that of a greyhound, &c. 6, 'Villæ Libri Duodecim: i., Domus; ii., Sylva Cædua; iii., Sylva Glandaria; iv., Cultus et Insitio; v., Pomarium; vi., Olivetum; vii., Vinea; viii., Arbustum; ix., Hortus Coronarius; x., Hortus Olivarius; xi., Seges; xii., Pratum: in quibus majori ex parte cum verus Plantarum Cultus, certaque Insitionis Ars et prioribus Sæculis non visos producendi Fructus Via monstratur, tum ad Frugum, Vini, ac Fructuum Multiplicationem Experimenta propemodum infinita exhibentur,' Francof., 1592, 4to. A learned and agreeable work, the contents of which are sufficiently expressed by the title-page. 7, 'De Refractione, Optices Parte, Libri Novem,' Naples, 1593, 4to. Among many things that are vague and inexact, are found now and then some just observations on a great number of objects relating to optics, such as refraction and the anatomy of the different parts of the eye. The seventeenth book of his 'Natural Magic' contains a portion of this treatise. 8, 'Pneumaticorum Libri Tres; cum Duobus Libris Curvilineorum Elementorum,' Naples, 1602, 4to., and in Italian, ibid., 1606, 4to. In this work he treats of hydraulic machines and their construction, and enters into great detail. A new edition of his 'Curvilinear Geometry' was published at Rome, 1610, 4to., with the addition of a third book, treating of the quadrature of the circle, the solution of which famous problem he flattered himself that he had rendered more easy. 9, 'De Cœlesti Physiognomiâ Libri Sex,' Naples, 1601, 4to., and frequently reprinted. In this work, though he rejects judicial astrology, he attributes nevertheless great influence to the heavenly bodies. 10, 'Ars Reminiscendi,' Naples, 1602, 4to. A collection of all the means of assisting and strengthening the memory that were practised by the antients. 11, 'De Distillationibus Libri Novem, quibus certâ Methodo, multiplicique Artificio penitioribus Naturæ Arcanis detectis, cujuslibet Misti in propria Elementa Resolutio perfectè docetur,' Rome, 1608, 4to., and Strasbourg, 1609, 4to. A curious work, from giving an idea of the state of chemistry in the beginning of the seventeenth century. 12, 'De Munitione Libri Tres,' Naples, 1608, 4to. A treatise on fortifications. 13, 'De Aëris Transmutationibus Libri Quatuor,' Naples, 1609, 4to. This is said by M. Musset Pathay (*Bibliog. Agronomique*, p. 51) to be the first work on meteorology in which any sound ideas are to be found. 14, His dramatic works consist of fourteen comedies, two tragedies, and one tragi-comedy. The comedies were collected into four volumes, 12mo., and published at Naples, 1726. All these works are analysed by H. Gab. Duchesne, at the end of his 'Notice Historique sur I. B. Porta,' Paris, 1801, 8vo. (*Biogr. Univ.*, and *Biogr. Méd.*)

PORTAL VEIN. [LIVER.]

PORTARLINGTON. [QUEEN'S COUNTY.]

PORTCULLIS, in fortification, is an assemblage of several large pieces of wood, joined across one another like a harrow, and each pointed with iron at the bottom. They are sometimes hung over the gateways of old fortified towns, ready to let down in case of a surprise, when the gates could not be shut. (James's *Military Dictionary*.) The French, at a very early period, called it 'porte-coulant,' *i.e.* sliding gate, which is the true etymology of the word. 'Coulisse' is likewise used by the French writers for the portcullis, whence our term is immediately derived.

PORTER, a kind of malt liquor, extensively consumed in London. The malt used for porter is high-dried; that is, it has been exposed to greater heat in the kiln than the pale malt used for ale and beer. [BREWING.] Porter was first brewed in 1722. The malt liquor previously drank consisted of three kinds, ale, beer, and 'two-penny,' and a mixture of two of either of these kinds was a favourite beverage under the name of 'half and half;' or a mixture was drunk called 'three threads,' consisting of equal portions of each of the above kinds of liquor, for a draught of which the publican had to go to three different casks. About 1722, Harwood, a London brewer, commenced brewing a malt liquor which was intended to unite the flavours of ale and beer, or ale, beer, and twopenny; and having succeeded, he called his liquor 'entire,' or 'entire butt,' a name intended to intimate that it was drawn from one cask or butt only. A mixture of ale and porter drawn from different casks is very commonly drunk in London at the present time. Harwood's liquor obtained the name of 'porter' from its consumption by porters and labourers. From 1722 to 1761 the retail price of porter was 3*d.* per pot, when it was raised to 3½*d.*, at which it continued until 1799; it has never been higher than 6*d.*, nor during the present century lower than at the present time (September, 1840), when the price is 4*d.* The following account of the fluctuations of the price per barrel since 1816 is from a private source.—In July, 1816, the price was reduced from 45*s.* to 40*s.*, but in October was again advanced to 45*s.*; in Jan. 1817, a further advance was made to 50*s.*, and in December of the same year it reached 55*s.* In 1819, 1820, and 1822, the price was successively reduced from 55*s.* to 50*s.*, 45*s.*, and 40*s.* In January, 1824, it was advanced to 45*s.*; in November, 1825, to 50*s.*; but a few months afterwards it again fell to 45*s.* Since the abolition of the beer duties, in 1830, the price has been 33*s.* per barrel.

During the existence of the duties on ale and beer, porter was never distinguished in the returns of the quantity of malt liquor charged with the duty; and any estimate of the extent of its consumption must be taken with caution. The brewing of porter has not been very successfully practised in the country 'collections' in England; and the peculiar excellence of 'London porter' probably arises from the large scale on which all the processes connected with the brewing, particularly the vatting, are conducted, as well as the skill of the brewers. In Barclay's brewery there are about 120 porter vats, each capable of containing 3500 gallons. In London the brewing of porter is confined to the great brewers, the others being chiefly ale-brewers. At the largest brewery in London the proportion of porter brewed is between one-ninth and one-tenth; and in the London 'collection,' where above one-half the malt consumed by brewers and victuallers in England is used, the proportion is probably one-sixth of the whole, or about one million bushels. This porter is not all consumed in London; for the estimation in which the article is held renders it not only in demand in every part of England, but also for export abroad. Allowing one-sixth for exportation, and for the provinces, the proportion of porter consumed in London will be about one-half of the whole quantity of malt liquor consumed. It is said that the taste of the public has a tendency to diminish this proportion. Porter is bottled in large quantities, both for home and foreign demand. The Railway Commissioners for Ireland remark, in their Second Report (1838), 'that Irish porter is now largely exported to England, and the Dublin bottled porter successfully rivals the London porter, even in London itself.'

PORTEUS, BEILBY, an eminent English prelate, was born at York in 1731. He passed several years at a small school in his native city, and when he was thirteen years old he was removed to a school at Ripon. From this place he went at an earlier age than usual to Cambridge, where he was admitted a sizar of Christ's College. His personal worth, united with his superior attainments, both classical and mathematical, soon procured him a fellowship in his College, and by the active exertions of his friends he was made esquire-beadle of the University. This office he did not long retain, but he chose rather to give his undivided attention to private pupils. In 1757, at the age of twenty-six, he was ordained deacon, and soon after priest.

He first became known as a writer by obtaining Seaton's prize for the best English poem on a sacred subject. On this occasion the subject was 'Death,' and the production of Mr. Porteus was universally deemed one of great merit. In 1762 he was made chaplain to archbishop Secker. His first preferments were two small livings in Kent, which he soon resigned, and took the rectory of Hunton in the same county. He was next appointed prebendary of Peterborough, and not long afterwards, in 1767, he became rector of Lambeth. In the same year he took the degree of D.D. at Cambridge, and in 1769 was made chaplain to king George III., and master of the hospital of St. Cross near Winchester.

In 1773, Dr. Porteus, with a few other clergymen, applied to the bishops, requesting that they would review the Liturgy and Articles for the purpose of making some slight alterations. In taking this step they proceeded in a temperate and respectful manner, and the answer declining to entertain the application, which archbishop Cornwallis returned in his own name and in that of the bench in general, was marked with great kindness. Dr. Porteus and his friends acquiesced in the decision of the bishops, and thus the affair ended.

In 1776, Dr. Porteus, without the least solicitation on his part, was made bishop of Chester; and in 1787, on the death of bishop Lowth, he was promoted to the diocese of London, over which he very ably presided till his death. In 1798 he began a course of lectures on St. Matthew's Gospel, which he delivered at St. James's church on the Fridays in Lent, and which he afterwards published. These lectures have been perhaps the most popular of all his works. He died May 14th, 1808, in the seventy-eighth year of his age. Though bishop Porteus cannot be called a profound scholar or divine, he was a man of considerable learning and ability; and he pursued through life a steady course of pious exertion for the benefit of his fellow-creatures, which procured him a high reputation among men of all parties. His works, consisting of sermons and tracts, with a 'Life of Archbishop Secker,' and the poem and lectures already mentioned, were collected and published in 1811, in five vols. 8vo., with his Life, making another volume, by his nephew, the Rev. Robert Hodgson, now Dr. Hodgson, dean of Carlisle. (*Life*, as above; Chalmers's *Biographical Dictionary*.)

PO'RTICI. [NAPLES, Province.]

PORTICO. Originally applied without distinction to colonnades and covered ambulatories, the term is now limited to signify a sheltered space enclosed by columns at the entrance to a building; and unless otherwise expressed, roofed with a pediment, like the end or front of a Grecian temple. The term therefore, as now generally restricted, answers to the *Pronaos* of such a temple. Porticos are described according to the number of columns in front, viz. tetrastyle, hexastyle, octastyle, &c. [CIVIL ARCHITECTURE; PARTHENON.] They are called prostyle when, as generally happens, they project from the main building. Such as are *in antis*, and recessed within the front of the building, are technically called *loggias;* the latter term indeed is not always employed in this particular sense, but it would be convenient if it were, as much ambiguity would thereby be prevented. Although, too, a loggia so far resembles any other colonnade, it differs from the other in being situated, like a portico, at the entrance and in the centre of a façade, whereas colonnades are usually lengthened ranges of columns in other situations; thus we speak of the 'colonnades' of the Louvre, of Greenwich Hospital, and of the piazza of St. Peter's at Rome.

Pseudo-prostyle is a useful term suggested by Mr. Hosking for such an arrangement of columns beneath a pediment as resembles a prostyle in elevation, but which, instead of advancing forwards, forms merely a slightly projecting break, the portico itself being within the building, and nowise differing from a recessed loggia, except that it is not *in antis*, and is crowned by a pediment. Of this kind is the Ionic portico of the East India House, which, instead of being a tetrastyle *in antis*, is converted into a hexastyle by placing six columns in such manner that the end ones come immediately before the antæ or pilasters. The front of the Law Institution, Chancery Lane, may also be called pseudo-prostyle, because, although a loggia *in antis*, it is surmounted by a pediment.

Even in prostyle porticos there is great difference of character merely as regards the degree of projection given to them, independently of other circumstances; some are made to advance a single intercolumn, and others project considerably more. At the risk therefore of appearing to innovate upon the terminology of architecture, we would propose the following terms:—*monoprostyle*, where the portico projects only one intercolumn, as the Ionic hexastyle of St. Pancras church, London; *diprostyle*, where the projection is two intercolumns, as in the porticos of St. Martin's, Charing-cross, and St. George's, Bloomsbury, and so on; by which method the portico of the Pantheon at Rome might be briefly yet distinctly described as a Corinthian octastyle *triprostyle*, that is, a prostyle with eight columns or seven intercolumns in front, and three open intercolumns at its its ends. Another circumstance, which it is highly important to note, is whether a portico be a simple prostyle, or be likewise *polystyle*, that is, whether the columns be merely external, or whether there are additional columns within the portico, as is the case with that of the Pantheon, which may therefore be further described as polystylar. The portico of the Kazan church, St. Petersburg, and those of the Glyptotheca at Munich, and Canova's church at Possagno, are also polystyle. This is likewise the case with the Corinthian octastyle of the Exchange at Glasgow; but scarcely an instance of the kind occurs in London, for the two columns within the portico of the National Gallery hardly entitle it to be so called, and the architectural feature of the Bank which we shall presently notice can hardly be classed as a portico.

Some porticos again may be termed compound prostyles, because, while they project from the building, they also recede within it, as is the case with those of the London Post-Office, University College, and Hanover Chapel, Regent Street; and such an arrangement gives greater effect as well as spaciousness, and prevents the portico from looking like a mere addition to the front of a building. Besides the varieties above enumerated, there are those which are semicircular in plan, of which the transept entrances of St. Paul's furnish very admirable examples; and another occurs in the pseudo-portico or portico-like compartment at the north-west angle of the Bank of England, which, owing to its being likewise recessed, and having columns behind those in front (not arranged concentrically, but placed on the chord to the outer curve), produces an unusually rich and picturesque effect. Beautiful however as the semicircular form is, it becomes unsuitable for such purpose if a portico so shaped cannot be made equal to a hexastyle, or a tetrastyle in antis, that is, have five intercolumns, because if there be only three, either the whole portico must be very narrow in proportion to its height, or the intercolumns so wide that the architrave over them will considerably overhang a line drawn from one column to another, and thereby produce an appearance both of deformity and weakness.

Whatever be the form adopted for a portico, however elegant it may be in all other respects, the character will be neutralised if the background or rear wall be filled with doors and windows. Such is the case with the otherwise noble and classical portico of St. George's, Bloomsbury, which has five arched doors, and as many windows of the same form over them, corresponding with the number of intercolumns of the hexastyle; the consequence of which is that those features are not only quite at variance with the character of the order, but petty in size, and squeezed together, so as to occasion a crowded and confused appearance. The portico of St. Martin's has fewer apertures, there being only three doors and the same number of windows above them, but they are of such horrible design as to be quite inconsistent with the exterior of the portico. Even when such apertures are in the same taste as the rest, they cut up the background to the columns, and give it a character at variance with that professedly aimed at. It is on this account that the pseudo-prostyle or pedimented loggia of the Law Institution looks like the façade of an Ionic temple in antis erected before a modern house-front. The Ionic hexastyle of the College of Physicians is not less faulty, having a door and four windows in the lower part, while above them there is only a single window in the centre, and a niche corresponding with each of the extreme intercolumns. On the contrary, much of the nobleness of character and beauty of design in the porticos of the transepts of St. Paul's, the Post-Office, St. Pancras church, University College, the National Gallery, and the Doric hexastyle in antis of the Corn Exchange arise from the circumstance of their having no windows, and from their doors being made rich and important features. The three doorways within St. Pancras' portico are of most exquisite design, but would have shown themselves to more advantage had they been placed farther back, for the portico being merely a monoprostyle, and not at all recessed, its shallowness causes the doors to be too close to the columns, and thereby prevents their being seen advantageously.

As to windows, unless they can be treated as doorways, and then placed only in the alternate intercolumns, they are such blemishes within any sort of colonnade or portico, that if they cannot be got rid of, both good taste and economy would be better consulted by giving up the portico altogether, and adopting a style of design where windows may be rendered both appropriate and ornamental features. So far however is this from being duly attended to, that frequently no study is bestowed upon such apertures when placed within a portico: a very glaring case of the kind occurs in what we should else pass by as beneath notice, namely, the very paltry Corinthian hexastyle, as it must be termed, forming the front of the Haymarket Theatre, which presents another most offensive solecism in the preposterous width of the lateral intercolumns. So far and so far only does that portico, though of the same order and denomination, resemble the highly beautiful one which graced Carlton House, and which, but for the defect alluded to, was one of the most tasteful and richest specimens that we possessed. It was a Corinthian hexastyle, diprostyle, but of triprostyle proportions, for in order to admit a carriage-drive into the portico (certainly a very great convenience in itself) one intercolumn in each flank was made equal to two of the others and a column, thereby producing a most offensive gap, and causing it to look as if a column had actually been removed in order to allow a carriage to pass. In all similar cases, where much greater width than that afforded by the other intercolumns is required for a carriage-entrance, the best plan would be to substitute an open arch at each end of the portico, by which means, while an equal or even greater breadth of opening might be obtained, it would not show itself to the eye as a positive gap compared with the spaces between the columns in front.* Stafford House, the duke of Sutherland's town residence, offers, among its other defects of design, a striking instance of very faulty and irregular columniation in the upper portico of the north front over that in the basement into which carriages drive: even two more columns might be added to each flank, for at present the entablature of those ends has no support except at its extremities, and consequently offends by the appearance of both poverty and weakness.

Having mentioned porticos which are raised upon a basement, we may further remark that their effect greatly depends upon the manner in which the basement itself is treated. This last-mentioned part should invariably be made to represent as far as possible a solid stylobate, with no windows, and if with only a single doorway the better, as is the case in the east front of St. George's Hospital, Grosvenor Place, where beneath the tetrastyle portico (which is remarkable, and by no means unpleasing in effect on account of its having square pillars instead of columns) there is only a door with a small niche on each side of it. On the contrary, a low basement with small windows beneath a portico has always a mean and crowded appearance, as may be seen in that of the Mansion-House. A similar objection applies to the portico added to the front of the Custom-House after the falling in of the Long-room, and which is certainly no improvement upon the original design. The effect of the portico of the National Gallery, on the contrary, is very much enhanced by its being placed on a solid stylobate more extended than the portico itself, whereby the latter seems to stand firmly on a terrace-like substruction. Besides the valuable expression of firmness and strength thus obtained, the breadth and repose of this lower part give additional effect to the columns, its horizontality contrasting forcibly with their upright lines, and its unbroken surface with the perspective and shadow in the interior of the portico. The only objection criticism can here allege is that the mouldings are rather tame and scanty, and that some further embellishment would not have been amiss. It may be presumed that the architect contemplated the introduction of statues on the piers where the ascent on each side commences; and if such pieces of sculpture should ever be added, they would greatly improve this portion of the façade.

Windows, as already observed, ought to be excluded altogether from a stylobate beneath a portico, but we should not so rigidly object to a series of other openings, whether arches or square-headed apertures between piers, provided they were confined to the centre, as for instance three open arches corresponding with the three middle intercolumns of a hexastyle above them, or with the alternate ones of a more extended colonnade. We conceive too that in similar cases, super-columniation, or rather sub-columniation, might be resorted to with propriety and effect; namely, by converting the insulated piers below into columns of short and massive proportions, so as to produce a distyle in antis, or three open intercolumns beneath the centre ones of a hexastyle, &c.

Although we do not exactly agree with those who would proscribe coupled columns altogether, we certainly protest against them for any kind of pedimented prostyle; such disposition has however most unfortunately been adopted in the principal portico of Buckingham Palace, owing to which what might have been an octastyle is reduced, as regards the number of intercolumns, to a tetrastyle. The intercolumniation also is exceedingly irregular, the intercolumn on each flank being nearly double as wide as those in front, a defect probably occasioned by the necessity of obtaining unusual width there in order to admit the royal state-carriage into the lower portico; for the principal portico, it should be observed, is raised upon another formed by a Grecian Doric order beneath the Corinthian, not applied as above recommended in such case, but continued throughout; whereas had there only been solid piers beneath the angles of the upper portico, the whole would have been in some degree improved, although there would still have remained the defect of diminutive columns and disproportionately wide intercolumns.

Respecting the mere temple-porticos of the antients, or rather the external arrangement of columns in such edifices, whether confined to the ends or continued along the sides, nothing need be said here, because they offer very little more than slight variations of the same idea, and those are sufficiently explained in the article Civil Architecture. But we shall now briefly pass in review some of the porticos

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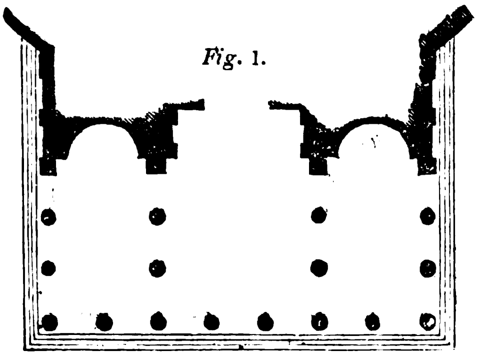
A plan affording an example of the kind may be seen in an article on Porticos and Colonnades in the first volume of the 'Library of the Fine Arts,' which is illustrated with several other original plans.

that most deserve notice on account of their *plan*, to which we shall confine our attention, passing over all other circumstances. We shall not therefore attend to the order of columns employed in them, nor take any account of their dimensions, the plans being drawn not to the same scale, but, for convenience sake, nearly to the same size. We commence with that of the Pantheon at Rome (*Fig.* 1), attached to a circular edifice [PANTHEON], and which, as will instantly be seen, is decidedly different from the usual portico at the end or front of a temple, or from those monoprostyles, or single external line of columns, which constitute the generality of modern porticos.

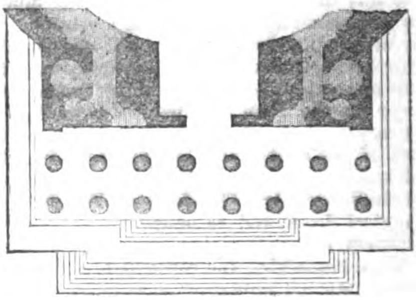
Fig. 1.



Besides being triprostyle, or having three open intercolumns on its flanks, it may be described as polystyle, having columns within, dividing it into three avenues or aisles, the centre one of which is extended by being considerably recessed, a circumstance that adds very greatly to the general effect.

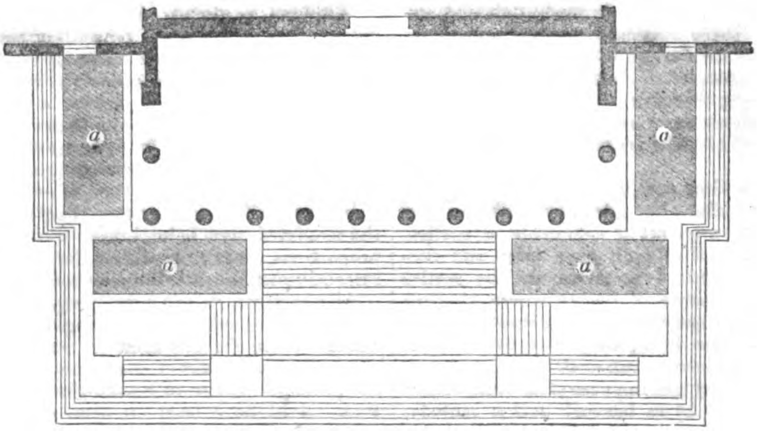
As being, like the preceding, attached to a rotunda, we have selected for the next plan that of the church erected by Canova at Possagno (*Fig.* 2). This also is a polystyle, though altogether different in its arrangement from the other, there being here merely a second range of columns behind those in front, on which account it might be designated a double octastyle.

Fig. 2.



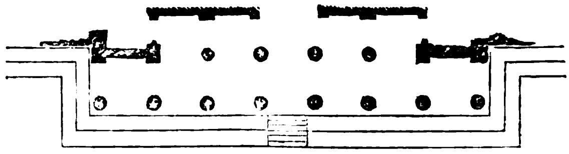
Although there are very few decastyle porticos, it is not merely as an example of one that we here exhibit that of University College (*Fig.* 3), since it might have been such without being at all worthy of notice for its plan, as is the case with the dodecastyle one of the Chamber of Deputies at Paris [PARIS], which is no more than a monoprostyle, or single line of twelve columns, beneath a pediment. That of University College, on the contrary, projects forward very considerably, it being equal to a triprostyle, or a pseudo-triprostyle, with one intercolumn closed up, owing to which it appears internally to be partly recessed, to be carried out two intercolumns, and inwards for the space of one. This example is further remarkable on account of the unusual and highly picturesque arrangement of the steps forming the ascent up to it, which commence below on each side, while above they form a single broad flight, in such manner as to leave screened areas, *a a*, which serve to admit light to the spaces in the basement beneath the portico.

Fig. 3.



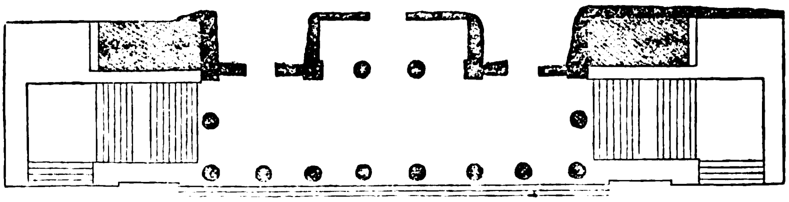
The portico of the Glyptotheca at Munich (*Fig.* 4) [MUNICH] may be described as monoprostyle, recessed, and polystyle, it being compounded of an octastyle advanced only one intercolumn before the rest of the front, and of a tetrastyle in antis behind it, forming five open intercolumns, the extent of the recessed part, by which means not only great richness of columniation, but a picturesque play and contrast are obtained.

Fig. 4.



Like that of University College, the portico of the National Gallery (*Fig.* 5) is pseudo-triprostyle, consequently projects as much as three intercolumns from the building; but, in other respects, differs very materially from it, being only partially recessed in the centre, where are two columns forming a distyle in antis, the only instance among all our London porticos of one with any columns within it. It also differs from the other example altogether in the ar-

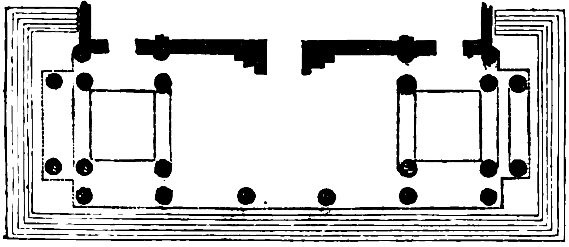
Fig. 5.



rangement of the steps leading up to it, relative to which some remarks have already been made.

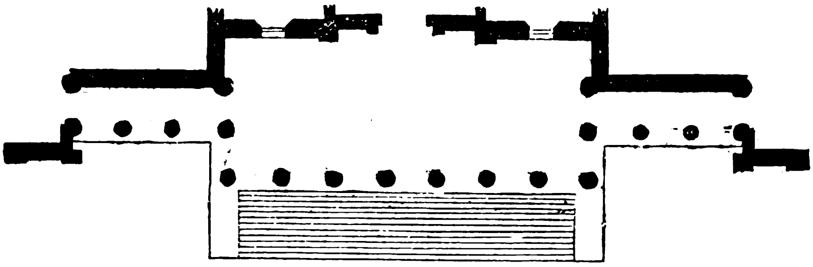
The portico of the Pantheon at Paris (*Fig.* 6) offers a more singular than judicious arrangement, two columns being projected at each end so as to produce a group of three at the external angles, which, although by no means displeasing in the ground-plan, produces an awkward effect in the structure itself or an elevation of it; because, instead of being included beneath the pediment, those columns and their entablature form mere little jutting-out bits, attached to the flanks, and almost suggest the idea of its being originally intended to continue them as lateral colonnades parallel to the hexastyle beneath the pediment (as in the next figure). Though this portico is only hexastyle in front, and has only four columns within, there are eighteen altogether, besides the half and three-quarter columns attached to the wall behind, a number sufficient to have formed an octastyle triprostyle with six inner columns, viz. four disposed as in the portico of the Pantheon (*Fig.* 1), and two forming a pronaos recess for the centre doorway, as in *Fig.* 5. Notwithstanding however the faults already adverted to, and that of its wide intercolumniation, compensated perhaps in some respect by the columns within the portico immediately behind those in front (but which defect might have been obviated by merely making an octastyle within the same space as the present hexastyle), notwithstanding these defects, there is very much to admire in this example, more especially when we compare it with preceding productions of the kind in modern times.

Fig. 6.



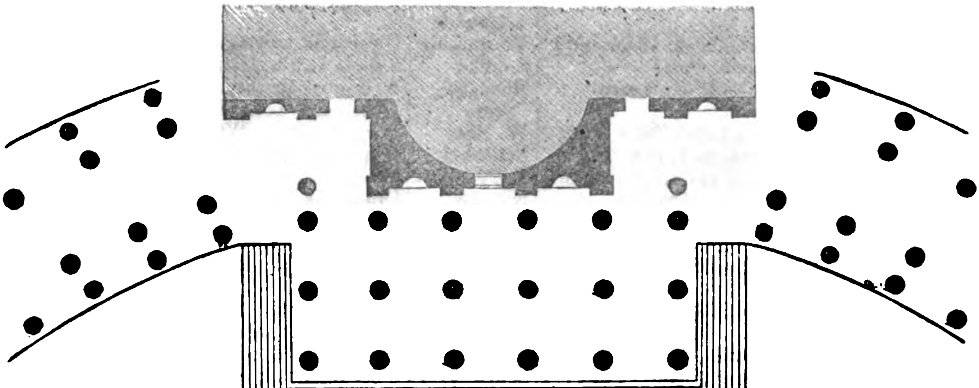
Our next example, which is the portico of the new Fitzwilliam Museum at Cambridge (*Fig.* 7), differs materially from the foregoing one, presenting a richer system of columniation in some respects; for though, technically speaking, no more than a monoprostyle octastyle, it is extended by lateral loggias, three intercolumns in width, and has besides considerable depth within. All that we object to is the substitution of engaged columns for antæ or pilasters, which would not only have been more suitable, but have produced greater variety; nor can we help thinking it would have been very much better to have placed a square pillar instead of a column at the inner angles formed by the junction of the returns of the octastyle and the lateral colonnades; both because these last would have thereby been better defined to the eye, and the meeting entablature would have appeared to be more solidly supported than when, as now, resting upon a circular shaft. Very like this in plan is the portico of the Capitol at Washington, whose centre is also an octastyle, but each of the lateral colonnades has one intercolumn more than those in the Cambridge building. Internally the disposition of the centre portion or octastyle resembles that of the Pantheon, shown in *Fig.* 1.

Fig. 7



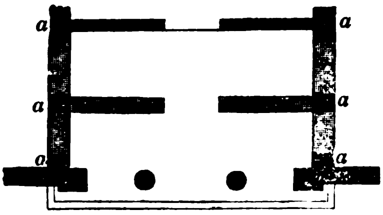
Although only a hexastyle, the portico of the Kazan Cathedral, St. Petersburg, towards the Nevsky Prospect, is an unusually rich example of a polystyle prostyle, and of certain peculiarities of arrangement which will be better understood from the plan itself (*Fig.* 8) than from any verbal explanation. The cut also shows a portion of the sweeping colonnades (in imitation of those by Bernini in the Piazza di San Pietro at Rome), and the mode in which they are connected, or rather not connected with, but merely brought up to the portico itself, which is so awkward and disagreeable as materially to detract from the effect of the whole.

Fig. 8.



On other porticos, which, whatever may be their denomination, or whatever their merits in point of style and execution, consist of no more than a single range of columns in front, we cannot stop to make any remarks, although several of them would furnish abundant matter for criticism, and among others that of Covent Garden Theatre, which, though generally received as such, is anything but a classical composition, the doorways being mean in the extreme, mere holes in the wall, and the windows above them destroying all architectural repose and breadth of effect. We cannot however pass over Mr. Gandy Deering's small Doric distyle in antis, in the front of the building originally erected for the Pimlico Proprietary School in Ebury Street (*Fig.* 9), since it claims to be brought forward by us as a solitary example of a portico with an inner screen carried up half way behind the columns, and with lateral openings at the ends of the portico between small antæ, *a*, *a*, &c., descending as low as the top of the screen, and two of them resting on its exterior ends. The idea is a valuable one, and admits of almost endless diversity and new combinations.

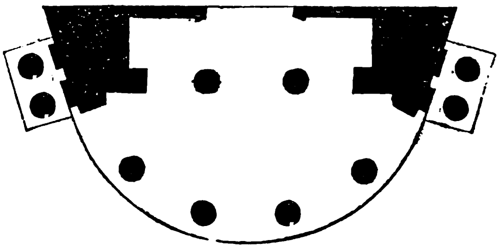
Fig. 9.



The only other example we shall offer is that of semicircular, or rather segmental loggia, forming the northwest angle of the Bank of England (*Fig.* 10), the most tasteful and picturesque piece of design that Sir J. Soane ever produced.

The effect of the inner columns, the contrast they afford to the others, their shafts being plain, while the rest are all fluted, the varied perspective appearance accordingly as the spectator shifts his station, and the great play of light and shade, all render this little bit quite an architectural study.

Fig. 10.



The annexed table may be found useful both as facilitating comparison and from its containing several additional examples, besides supplying various further particulars in regard to some of those which are represented in the plans above given.

Table of Porticos.

Class.	Order.	Building.	Architect.	Remarks.
Dodecastyle	Corinth.	Chamber of Deputies, Paris	Poyet	Monoprostyle, sculptured pediment.
Decastyle	„	University College, London	Wilkins	Hyper-diprostyle, recessed. Height of columns 30 feet.
Octastyle	„	Pantheon, Rome	. . . .	Hyper-triprostyle. Polystyle and recessed.
„	„	National Gallery, London	Wilkins	Hyper-diprostyle, with distyle in antis, recess within.
	„	Fitzwilliam Museum, Cambridge	Basevi	Monoprostyle, recessed, and with order continued laterally, forming three intercolumns on each side.
„	„	Victoria Rooms, Bristol	Dyer	Unequal diprostyle, recessed, five intercolumns.
„	„	Exchange, Glasgow	Hamilton	Diprostyle, with two inner columns corresponding with second and seventh of the octastyle.
„	„	Buckingham Palace	Nash	Columns fluted, their height 26 feet.
Octastyle-Peripteral	„	Birmingham Town-hall	Hansom & Welsh	Columns 36 feet high. Side elevations of twelve intercolumns on flanks.
„	„	La Madeleine, Paris	Huvé	See PARIS.
„	„	Girard College, Philadelphia	Walter	Columns 55 feet high; marble.
„	Doric	The Walhalla, Bavaria	Klenze	
Octastyle	Ionic	Glyptotheca, Munich	Klenze	Monoprostyle, polystyle, recessed, tetrastyle in antis.
„	„	Great Theatre, Petersburg	Thomond	Monoprostyle.
„	Doric	Church at Possagno	Canova	Diprostyle, polystyle, double octastyle.
„	„	Manège, Petersburg	Quarenghi	Monoprostyle, polystyle, recessed.
„	„	Royal Institution, Edinburgh		
Hexastyle	Corinth.	St. Martin's, Charing-cross	Gibbs	Diprostyle, height of columns 34 feet.
„	„	St. George's, Bloomsbury	Hawksmore	Diprostyle, five arched doors, and five arched windows above them.
„	„	St. George's, Hanover Sq.	J. James	Monoprostyle.
„	„	Law Courts, Dublin	Cooley and Gandon	Monoprostyle.
„	„	Kazan Church, Petersburg	Voronikhin	Diprostyle, polystyle, a triple hexastyle.
„	„	Pantheon, Paris	Soufflot	Reliefs within portico, height of columns 62 feet.
„	„	Madre di Iddio, Turin	Buonsignore	A diprostyle, attached to a rotunda. Two inner columns behind the penultimate ones in front.
„	„	Custom-house, New York	W. Ross	Monoprostyle. White marble; columns 32 feet high.
„	„	St. Nicholas's, Potsdam	Schinkel	Hyper-monoprostyle.
„	Ionic	Bethlem Hospital, London	Lewis	Monoprostyle; height of columns 36 feet.
„	„	Post-Office, London	Smirke	Diprostyle, recessed, columns 37 feet high.
„	„	Theatre, Berlin	Schinkel	Monoprostyle, flight of steps in front.
„	„	East India House, London	Jupp	Pseudo-prostyle; height of columns 30 feet.
„	„	St. Pancras' Church, London	Messrs. Inwood	Monoprostyle; florid Ionic; columns 36 feet high.
„	„	Royal Institution, Manchester	C. Barry	Monoprostyle. Order continued laterally, forming loggias of three intercolumns on each side of prostyle.
„	„	Post-Office, Dublin	F. Johnston	Monoprostyle, columns 36 feet high, fluted.
„	„	Raadhus, Copenhagen	Hansen	Monoprostyle; deep recess in centre with steps.
„	Doric	Colosseum, London	D. Burton	A monoprostyle attached to a polygon.
„	„	Hunterian Museum, Glasgow	. . . .	Monoprostyle, recessed, with a distyle in antis.
„	„	County-hall, Chester	T. Harrison	Monoprostyle, polystyle, recessed. A double hexastyle.
„	„	Wacht-Gebaude, Berlin	Schinkel	Monoprostyle, recessed as a tetrastyle in antis.
Pseudo-hexastyle	Corinth.	Front of Roman Catholic Chapel, Finsbury Circus	. . . .	Four pilasters and two columns beneath a pediment, or five intercolumns.

PORTLAND (Isle). [DORSETSHIRE.]

PORTLAND, DUKE OF. [PITT.]

PORTLAND (America). [MAINE.]

PORTLAND OOLITE, a term in geology, synonymous with epioolite of Brongniart, and upper oolite of some English geologists.

PORTLAND STONE. [DORSETSHIRE.]

PORTLAND VASE. The beautiful specimen of antient art known by this name, but formerly bearing the appellation of the Barberini Vase, is one of the choicest treasures deposited in the British Museum. The time of its production is now unknown; but it is presumed to be the work of a Grecian artist. The first information we have respecting it is, that about the middle of the sixteenth century the vase was found enclosed in a marble sarcophagus, within a sepulchral chamber, under the mount called the *Monte del Grano*, about two miles and a half from Rome on the road leading to Frascati. This sepulchral chamber appears to have been the tomb of the emperor Alexander Severus and of his mother Julia Mammæa; and the vase was probably a cinerary urn belonging to the sepulchre. Bartoli, in his work on Roman and Etruscan sepulchres (*Gli Antichi Sepolcri*, 1704), has given a sectional representation of the Monte del Grano, with the hollow sepulchre within, and the spot in which the sarcophagus was found lying. The elegance of form and the admirable workmanship of the vase procured for it, as well as for the sarcophagus which enclosed it, a place in the palace of the Barberini family at Rome, where it remained more than two centuries; after which it became the property of Sir William Hamilton, from whom it passed to the Duchess of Portland. At length, in the year 1810, it was deposited in the British Museum by the Duke of Portland, and placed on an octagonal table in the middle of the small ante-room (No. 9) at the head of the stairs leading from the gallery of antiquities.

This vase was said by Montfaucon to be formed of a precious stone; but subsequent examination has shown the material to be dark blue glass, relieved by figures and devices in white enamel. It is about ten inches in height, and beautifully curved from the top downwards; the diameter at the top being about three inches and a half; at the neck or smallest part, two inches; at the largest part (mid-height), seven inches; and at the bottom, five inches; with two handles, one on each side. The blue tint of the glass is rich and beautiful, and is rendered still more so by the contrast of the delicate white enamel of which the figures are formed. These figures are seven in number, three men, three women, and a winged Cupid; but the story or scene represented has never been satisfactorily explained, although many attempts at explanation have been made. Dr. King (*Archæologia*, vol. viii.) endeavours to show, by a somewhat forced construction, that the scene had a mythological relation to the birth and acts of the emperor Alexander Severus; and other theories of a similar kind have been advanced. The figures however, whatever may be their import, are placed in the following order: on entering the ante-room one of the handles is first seen, having beneath it a wild-looking head, with long hair and beard; near the handle (to the right) is a male figure standing under a kind of porch, and offering his extended arm to a female seated on the ground, over whose head bends the branch of a tree: a winged boy is hovering over these two figures; and to the right is a man leaning his elbow, in an easy attitude, on his knee, the foot being raised on a stone, and his chin resting on his hand. We then come to the second handle, which has a head under it similar to that on the opposite side; near this handle is a man seated on a stone, and looking at a female figure reclining in an easy and elegant attitude, with an inverted torch in her left hand, and the right passing over her head; the branch of a tree bends over her, and at her left hand is another male figure, who is looking towards her, and holding a staff in his left hand. These figures are about five inches in height, and are modelled or moulded with minute accuracy. Being different in colour and in opacity from the glass on which they are laid, they must have been fashioned before being fixed on the vase; yet the union has been so complete that no joint can be seen between them, and the minute details of the figures have not been in the slightest degree injured by the heat which in all probability was necessary for the process of cementation. At the bottom of the vase is an enamelled head and bust of a figure whose hand is elevated towards the mouth, and who has a fine Grecian outline of face. As this part of the vase cannot be seen in its present position, a cast of it is attached to the stand on which the vase is placed. Dr. King was of opinion that this head was part of a larger work, and was cemented on the vase by a process different from that employed on the other parts.

A mould of the vase was made by Pechler, the gem engraver, while it was in the possession of the Barberini family; and from this mould a certain number of casts in plaster of Paris were taken by Mr. Tassie, who afterwards destroyed the mould. Mr. Wedgwood made a small number of copies of this vase, which were sold at about twenty-five guineas each, and which were distinguished for the admirable skill displayed in their production. The moulds employed for these copies are, we believe, still in existence; but the extreme difficulty of the manufacture renders their production, as a commercial speculation, unprofitable.

PORTO BELLO. [PUERTO BELLO.]

PORTPATRICK. [WIGTONSHIRE.]

PORTO. [OPORTO.]

PORTO SANTO. [MADEIRA.]

PORTA, BACCIO DELLA. [BACCIO.]

PORTRAIT (*Portrait*, French; *Ritratto*, Italian; *Bildniss*, German; *Imago*, Latin; *εἰκών*, Greek). A portrait, strictly speaking, signifies the likeness of anything whatever, whether animate or inanimate, either drawn or coloured upon a flat surface: in a more restricted sense it signifies a drawing or a painting representing the likeness of any particular individual; but it is also frequently applied to the pictures of animals.

Portrait, says Lord Orford, is the only true historical painting. Its uses are manifest; it administers to the affections, it preserves to the world the features of those who, for their services, have merited the gratitude of mankind, and of those who have been in any way remarkable for their own actions or through their position in society; and in a simply historical point of view, it illustrates the costume and habits of past ages.

Portraiture seems to be almost as antient as the art of painting itself; indeed, according to the romantic legend told by Pliny (*Hist. Nat.*, xxxv. 12, 43), it was in Greece the origin of the imitative arts; an enamoured Corinthian maid traced the profile of her lover around his shadow cast by a lamp upon the wall.

The most antient portraits extant, if they can be termed such, are those which have been found in the cases of mummies: there is a singularly fine specimen of these preserved in the Egyptian museum of the Louvre in Paris; and there is also one of mean execution in the British Museum.

It was a custom among the antients, in very early times, for warriors to have their portraits painted upon their shields, called by the Romans *imagines clipeorum*, or *imagines clipeatæ*, and these shields were frequently dedicated in the temples in honour of their owners when deceased, or placed by victors as trophies (clipei votivi). The portraits were most probably painted in wax, but that they were well executed is very doubtful. (Pliny, xxxv. 3.)

Among the Romans, in the time of the republic, the possession of the portraits of their ancestors (*imagines majorum*) was a proof of nobility, for by the *jus imaginum* none were permitted to make portraits of themselves except those who had themselves or whose ancestors had borne some curule magistracy; and Roman families were accustomed to boast of their *fumosæ imagines* as a proof of their antient nobility. (Cic., *In Pisonem*, 1.) These portraits or images, which were of wax, were preserved with great care by their posterity, and were only brought out upon great occasions or carried before them in funeral processions. (Pliny, xxxv. 2.) They were probably painted busts, for the art of casting with wax in plaster moulds taken from the life was, according to Pliny (xxxv. 12, 44), invented as early as the time of Alexander, by Lysistratus the brother of Lysippus. It seems that the Romans were also sometimes in the habit of prefixing the portraits of authors to their works. Martial mentions one of Virgil (xiv. 186).

The most antient portrait-painter of extraordinary merit on record was apparently Dionysius of Colophon: he is praised by Aristotle (*Poet.*, 2) for the fidelity of his paintings; and from what Plutarch says (*Timol.*, 36) of the high finish of his works, we may perhaps term him the Holbein of antiquity: he flourished, as nearly as can be ascertained, shortly after the time of Polygnotus and Phidias, about 430 B.C.

The most famous portrait-painter among the antients was Apelles: he enjoyed the exclusive privilege of painting the portraits of Alexander: one of his most celebrated pictures was a portrait of that monarch as Jupiter, called the 'Alexander Ceraunophoros,' for which, according to the incredible account of Pliny (xxxv. 10, 36), he received twenty talents of gold (upwards of 50,000*l.* sterling); so large a sum, that it was measured to the painter, not counted ('mensura, non numero'). Most of the pictures of Apelles were portraits in an extended sense, yet it is doubtful whether before the time of the Roman emperors there was a distinct class of painters who confined themselves to portraits ('imaginum pictores:' Pliny, xxxv. 11, 40). Even in the great days of Italian art there was not a distinct class of portrait painters as in the present times; and it is an incontestable fact, that although upon the whole the number of good portrait-painters has very much increased, still portrait-painting itself has not improved since such has become the practice.

The success of a portrait depends upon the sitter as well as upon the painter, and it may be spoiled by the bad taste of the one or the other. Excellence in portraiture consists in placing every feature in its proper place, in a correctness of modelling, a judicious arrangement of light and shade suited to the complexion of the subject, and in tasteful attire and an unaffected and simple attitude; the former are within the province of the painter, the latter in that of the sitter. Much of the character may be shown by the posture, and the painter should adopt that which appears most natural to his sitter, for the habits of nature must be distinguished from those of fashion; no defect is more striking in a portrait than a forced and affected attitude.

In every portrait the countenance of the person represented should constitute the picture; all accessories must be kept subordinate to the principal object, and should not engage the attention except when expressly examined, for they are the mere adjuncts necessary to indicate the character, rank, or nation of the original. Upon these principles a good portrait must be a good picture, for the beauty of a picture consists in the harmony of the whole in composition, colour, and execution; and when every part has received no more of the painter's attention than its local importance requires, a picture cannot in any particular deviate from the truth, simplicity, and unity of nature. Fancy costumes are injurious to portraits as portraits, for a general resemblance being the principal object of portraiture, the subject should be clothed as usual, and the more simple the attire, the more prominent and consequently the more important will be the head, which is the principal object. Whatever deviations are allowed from this principle, although the picture may perhaps gain in pictorial effect, it must lose as a portrait. A mere insipid transcript of the features, and an equally minute attention to the detail of the accessories, are a degradation of portrait. There is no other difference between historical painting and portrait painting than that portrait exacts a stricter attention to the individual character, and consequently requires a more careful execution of the head, but the draperies and accessories should be equally bold and free as in historical painting. Large canvasses, and what are termed full-lengths, are ill suited to portrait, and the latter are seldom successful even under the most able hands. How often we see a great field of canvass, where the head is a mere speck, and is generally lost in the mass of accessories, of trees, columns, or draperies; these are pictures of robes, not of men, and are only tolerable as state portraits, when the insignia of rank or office are more important than the individuals. Such should be termed Iconics (*εἰκονικοί*) rather than portraits. [Panaenus.]

Expression is perhaps the most important study in portrait. To represent the true character of an individual, the countenance should be painted in repose, when no particular sentiment or passion predominates; for an otherwise good picture may be rendered a very bad portrait through the injudicious adoption of some transitory expression, or the introduction of a smile put on for the occasion, when perhaps the mouth is smiling whilst the eyes are languid and fatigued. The expression may be also materially injured by exaggerating the local tints, which in most cases has the effect of changing the complexion, and the particular expression of every individual depends upon the complexion as well as upon the relative proportions of the features. It is by accurately giving these proportions that what is called a striking likeness is produced, and this may be accomplished without entering into any minute detail of the parts; the features are indicated rather than expressed: this is a principle of historical painting, but is a style only fit for the portraits of public characters, or such as are to be placed in spacious localities, and must be viewed at a distance.

Such portraits, when even of only tolerable resemblance, are generally pronounced to be striking likenesses, especially by those who have but an imperfect knowledge of the persons represented; for they are themselves unacquainted with any more of the physiognomy of the originals than they see expressed in the pictures. These portraits however lose their resemblance either upon close inspection or upon a prolonged view.

The most successful painters of portrait in modern times have been Lionardo da Vinci, Raffaelle, Sebastian del Piombo, Giorgione, Paris Bordone, Titian, Velasquez, Holbein, Hals, Rembrandt, and Vandyck; and the following pictures are amongst the finest specimens of portrait painting extant:—his own portrait by Lionardo da Vinci, in the portrait gallery at Forence; Andrea Doria, by Sebastian del Piombo, in the Palazzo Doria at Rome; the head of Guido by Simone Cantarini, in the Academy at Bologna; Titian and Aretin, by Titian, in the royal collection at Windsor; Pope Innocent X., by Velasquez, in the Palazzo Doria at Rome; the Meyer Family, by Holbein, in the gallery at Dresden; and the head of Gevartius, by Vandyck, in the National Gallery in London.

Of the portrait painters of more recent times, Mengs, Reynolds, Gainsborough, David, Gerard, and Lawrence have enjoyed the greatest celebrity.

PORTSMOUTH, a corporate town in Hampshire, on the coast of the English Channel, and the principal station of the English navy; it is 66 miles in a direct line south-west of St. Paul's, London, or 73 from the General Post-Office by the mail-road through Kingston, Guildford, Godalming, and Petersfield; in 50° 47′ N. lat. and 1° 7′ W. long.

The harbour of Portsmouth is formed by the western end of an inlet of the British Channel, which, with its various creeks, extends nearly sixteen miles from west to east, from Fareham, in Hampshire, to Fishbourn, a village close to Chichester in Sussex; and about four miles, on an average, from the open sea, inland. Two large alluvial islands, Portsea island on the west and Hayling island on the east, divide this inlet into three parts: the westernmost and smallest part forms Portsmouth harbour, between Portsea island and the main; the middle portion, between Portsea island and Hayling island, forms Langston harbour; and the eastern part, between Hayling island and the main, is divided by a smaller island (Thorney Island) into Emsworth channel and Chichester harbour. Each of these divisions presents, when the tide is up, a noble sheet of water; but when the tide is out, they are chiefly occupied by mud-banks, separated by channels of greater or less width. The greater depth of the channel, the narrowness of the entrance, and the consequent facility of defending it, render Portsmouth harbour by far the best of the three. The roadstead between the mouth of Portsmouth harbour and the Isle of Wight forms an anchorage, part of which is well known under the name of Spithead. Adjacent to Spithead, on the coast of the Isle of Wight, near the eastern extremity of the island, is the bay of St. Helen's, a place of rendezvous for the navy; and near the coast of the Isle of Wight, between Cowes and Ryde, is the Motherbank, an anchorage for smaller vessels.

The excellence of the port attracted the notice of the Romans, who established a station at Porchester on its northern shore; this was probably the Portus Adurni, or perhaps the 'Portus Magnus' of the Notitia; and the element of the Roman name Port-us has been transmitted directly or mediately to the modern Port-chester, Portsea (Port's-ey, 'the island of the port'), Ports-mouth, Ports-down, and Gos-port. The decline of Port-chester, where there are still some Roman remains [Hampshire], is ascribed to the retiring of the sea, in consequence of which the inhabitants removed and built Portsmouth, which is first noticed in the 'Saxon Chronicle' on occasion of the landing (A.D. 501) of a body of Saxons, allies of Cerdic, founder of the West-Saxon kingdom. The leader of this body is said to have been called Porta, and some have supposed the name of Portsmouth to have been derived from this circumstance; but the etymology given above appears much more probable. [Hampshire.]

Portsmouth was a place of importance in the time of Henry I. Robert of Normandie landed here with a strong force (A.D. 1101), when he came to dispute the crown with Henry [Henry I.]; and the empress Maud, with her supporter the Earl of Gloucester, landed here (A.D. 1139 or 1140) to dispute the crown with Stephen. Richard I. granted to the town a charter, with the privilege of a weekly market and a yearly fair of fifteen days; and from some antient records it has lately been ascertained that there was a naval station at Portsmouth in the reign of John. In the time of Richard II. (A.D. 1377), Portsmouth was burned by the

French. Edward IV. and Richard III. secured it by fortifications; which were completed by Henry VII. In the reign of Henry VIII., it became the principal if not the only station of the English navy, and in A.D. 1544 an indecisive engagement between the English and French fleets took place off Spithead. In the time of Charles I. (A.D. 1628), the duke of Buckingham, who had come down to hasten the equipment of the armament for the relief of Rochelle, was assassinated here. In the great civil war, the town was garrisoned for the parliament. The marriage of Charles II. with Catherine of Braganza was celebrated here (A.D. 1662). Since the time of Henry VIII. the fortifications have been so far extended (especially in the reigns of Charles II., William III., and George III.) as to be now impregnable. It is said to require a garrison of 13,500 men to man the works and the forts, in case of a siege. The moats, which are wide and deep, can be filled with water from the sea.

The town of Portsmouth is situated at the south-western extremity of Portsea island, and just at the entrance of the harbour. It is enclosed by fortifications forming a semicircle to landward, and has an area of 110 acres; it contained, in 1831, 1195 houses (beside 6 building and 40 uninhabited), inhabited by 1627 families; the population was 8083. The streets, with the exception of High-street, are narrow, and consist of houses of inferior appearance. There are some substantial houses in High-street, and on the Grand Parade, which is at the western end of High-street. North of Portsmouth is Portsea, considerably larger than Portsmouth, extending along the harbour, and containing the dock-yard and the principal establishments connected with it. Portsea, like Portsmouth, is strongly fortified, and its defences are so united with those of Portsmouth, that the two towns may be considered as comprehended in the circuit of one fortress. The streets of Portsmouth and Portsea are well lighted and paved. Outside the fortifications of these two towns are extensive suburbs, as Southsea on the east of Portsmouth, Landport adjacent to Portsea, and Mile End and Kingston rather more remote. Some of the houses in the suburbs are handsome, especially those on Southsea Common; others, though neatly and regularly built, are smaller and of inferior description. There are some groups of habitations less connected with Portsmouth. All these suburbs are in the parish of Portsea, which comprehends the whole of Portsea island, except the town of Portsmouth, some extra-parochial districts, chiefly belonging to government, on the east side, on the shore of Langston harbour, formerly occupied by some salterns, and the northern extremity of the island, which is in Wimmering parish.

The mouth of Portsmouth harbour is about two miles wide between Fort Monkton and Southsea Castle, two strong forts erected to command the approach. Within these points the passage narrows to about a furlong, at what may be considered the true entrance into the harbour: within this entrance the harbour widens to half a mile between the dock-yard at Portsea and the town of Gosport on the opposite side; farther in, it expands to the width of three miles, and contains the three small low islands—Pewit Island, Horsea Island, and Whale Island. There is sufficient depth of water for a first-rate ship to enter the harbour at almost any time of the tide. About a mile and a half from the entrance the main channel branches into three arms, leading respectively to Fareham, Porchester, and Portsbridge and the northern end of Portsea Island. The dockyard is the largest in the kingdom, covering from 115 to 120 acres; it has a wharf-wall along the harbour of nearly three quarters of a mile, and is enclosed on the land side by a wall fourteen feet high, which completely separates it from the town. It includes a ropehouse, anchor-wharfs, an anchor-forge, a copper-sheathing foundry and mills; block, mast, sail and rigging, and other store houses; a grand basin, in which vessels are received with all their standing and running rigging to be repaired; building-slips, docks for repairing—in a word, all that is requisite for the construction, equipment, armament, and repair of vessels. There are also residences for the port admiral, the admiral superintendant and the other officers of the yard, a chapel, a school for Naval Architecture, and other buildings. The block-machinery, invented by Mr. Mark Joambard Brunel, is an admirable manifestation of mechanical skill; it is impelled by steam. There are forty-four machines which are arranged in three sets for blocks of different sizes. They take the rough timber, cut it up, shape and bore it, and carry the process through to the completion of the blocks. The machinery is capable of producing 1400 blocks daily, and supplies the whole of the British Navy. The number of men employed in the dockyard, in time of war, has amounted to 4000 and even 5000. The dockyard has three times been seriously injured by fire: in 1760, from the effect of lightning; in 1770, from an unascertained cause; and in 1776, from the attempt of an incendiary, John Aitkin, otherwise 'Jack the painter,' who was executed for the crime at the dock-gates, on a gallows 64 feet high, and afterwards hung in chains on the beach, on the west side of the entrance of the harbour. Adjacent to the dock-yard is the spacious and well furnished Gun-wharf and its connected buildings. It is the grand depôt for cannons, shot, and every description of ordnance stores.

The parish church of St. Thomas, Portsmouth, is a spacious building, including some antient portions, but mingled with additions of various later periods. The tower is 120 feet high, and forms a good mark for seamen, but the architecture is heavy and tasteless. It is surmounted by a cupola and lantern; the whole is crowned by the model of a ship, which serves as a vane. The garrison-chapel is on the Grand Parade; it is an antient structure which belonged to the hospital of 'Domus Dei' (House of God), repaired and fitted up for the officers and soldiers of the garrison. The parish church of St. Mary, Portsea, is in the suburb of Kingston; it is an antient building surrounded by one of the largest burial-grounds in the kingdom. The chapels of St. George and St. John, in Portsea, are commodious edifices of little architectural beauty, erected in the latter half of the last century; the new church of St. Paul, Southsea, capable of accommodating 1900 persons, is a quadrangular building, in the perpendicular style of Gothic architecture, with four low turrets at the angles; the church of All Saints, Mile End, is of similar architecture, with a handsome western front, crowned with a bell-turret, and will accommodate more than 1700 persons. A new Gothic church with a tower has been built at Portsmouth, capable of holding above 1200 persons, and another of very pleasing architecture is in course of erection in Portsea: making altogether nine places of worship of the establishment. Those of the Protestant Dissenters are yet more numerous; and there are a Roman Catholic chapel and a Jews' synagogue.

Among the other public buildings are the town-hall with a covered market-place underneath, in High Street; the governor's house, on the Grand Parade, originally part of the hospital of Domus Dei, but so much altered as to retain little of its monastic appearance; the residence of the lieutenant-governor; the theatre; the building of the Philosophical Society; and a national school house, with elegant concert, assembly, and card rooms above: all these are in Portsmouth. The ramparts are planted with trees, and form an agreeable promenade; the saluting battery, at the end of the Parade, commands a fine view of the anchorage of Spithead and the Isle of Wight. On the London road, about two miles from the town, extending from the road to the harbour, is an extensive cemetery, laid out and planted with trees, and furnished with a chapel for the burial service, and an office for the officiating minister.

The population of Portsmouth has been given: that of Portsea, in 1831, was 42,306; of Portsmouth and Portsea together, 50,389. (*Pop. Returns.*) Of the inhabitants of Portsea, 14,874 were in the town, 23,325 in the suburbs. (*Rep. of Municip. Corpor. Commissioners.*) The area of Portsea parish is given in the same Return at 4980 acres; the number of inhabited houses at 8215, beside 57 building and 327 uninhabited; and the number of families at 9767. The trade of the place, which is considerable at all times, but especially in time of war, depends much upon the expenditure connected with or caused by the naval station and dockyard, and is of a very miscellaneous character.

The port extends from the town of Emsworth, on Emsworth channel on the east, to the entrance of Southampton Water on the west; and includes Portsmouth and Langston harbours, Emsworth channel, and the roadsteads of Spithead and the bay of St. Helen's between Portsmouth and the Isle of Wight. There is considerable coasting and foreign trade carried on. The Portsmouth and Arun Canal was originally carried nearly across Portsea Island (entering it from Langston harbour, across which the canal boats are towed by steam) to its terminus in a capacious basin at Landport;

but the creek at Portsbridge has, since the last peace, been rendered navigable. Barges have thus direct access to the docks and wharfs of the harbour and the towns surrounding it, and the cut being now useless, the basin has been filled up and built upon. There is a considerable import of coal (it has increased thirty per cent. in the last ten years), and also of cattle, from the Isle of Wight and from the west of England. Fifty thousand sheep have been brought in in a single year. Corn and provisions are brought in from Ireland, eggs from France, timber from the Baltic, and wine is imported direct from the Continent. Several steam-vessels visit the port, some of which go and return several times in the day; and there are others which touch here in their passage. Communication is thus kept up with the Isle of Wight, Southampton, Plymouth, and Hâvre. A considerable part of the land round the town is laid out in market-gardens, from which the town is supplied with excellent vegetables. Tuesday, Thursday, and Saturday are market-days. There is a yearly fair of fifteen days from the 10th of July; and a holyday fair, held on Portsdown Hill, at the close of Portsmouth fair, is much frequented.

The corporation of Portsmouth is said to have been established by Henry I., but the earliest known charter is of Richard I.; many subsequent charters were granted. The borough limits formerly included the parish and town of Portsmouth, the town of Portsea, and a considerable part of the parish of Portsea, extending along the harbour, the whole of which was in the jurisdiction of the corporation. By the Boundary Act the limits were extended, for parliamentary purposes, so as to include the whole parish of Portsea; and by the Municipal Reform Act the parliamentary limits thus extended were adopted for municipal purposes. The enlarged borough is divided into six wards. The number of aldermen was fixed, by the Municipal Reform Act, at 14; the number of councillors at 42. Quarter-sessions for the borough are held. There is a Court of Record, having jurisdiction in all personal actions, and petty-sessions are held three times in the week. The prison is not well situated, nor is it sufficient for the proper classification of the prisoners. There is neither chapel nor chaplain. The place is kept clean, but the discipline is considered too lax. (*Inspectors of Prisons' Third Report.*) The average number of prisoners is 50. Portsmouth first returned members to parliament 23 Edward I.; the number of voters, before the Reform Act, was very small, but is now considerable. The number on the register in 1835-36 was 1439.

The living of Portsmouth is a vicarage, of the clear yearly value of 555*l.*, with a glebe-house. The living of Portsea is also a vicarage, of the clear yearly value of 696*l.*, with a glebe-house. The perpetual curacies of the chapels are, in clear yearly value, as follows: St. George's, 45*l.*, with a glebe-house; St. John's, 141*l.*, with a glebe-house; St. Paul's, Southsea, 310*l.*; and All Saints, Mile End, 160*l.* The vicar of Portsea is patron of these, except St. John's, to which the proprietors of pews present.

There were, in 1833, in the parishes of Portsmouth and Portsea, an infant school, with 40 children, held in Portsea workhouse; a grammar school for 20 free scholars; a large school, called 'The Beneficial Society School,' with from 260 to 300 boys; 'The Portsea Institution,' for 110 girls; two Lancasterian schools, with 250 boys and 112 girls; two national schools, with 409 boys and 160 girls; 'the seamen's school,' with 210 boys and 80 girls; a 'national school of industry,' with 40 boys and 40 girls; two workhouse schools, with 70 boys and 60 girls; and four other schools, wholly or partly supported by subscription, with 271 children of both sexes. There was a proprietary school, with 100 boys, and there were about two hundred and seventy day or boarding and day schools, most of them of a very humble description. There were Returns of the number of scholars from two hundred and seventeen of these schools, which contained 1243 boys, 475 girls, and 2657 children of sex not distinguished. There were, at the same time, twenty-six Sunday-schools, with 4629 scholars of both sexes. Some of the charity and most of the Sunday-schools have lending libraries attached. There are a Portsmouth and Portsea Literary and Philosophical Society, with a tolerably extensive museum; an institution, called 'The Hampshire Literary Society,' with a valuable collection of books; and a Mechanics' Institution.

Beside the fortifications of the two towns of Portsmouth and Portsea, the island of Portsea has strong defences. On the southern extremity is Southsea Castle, built by Henry VIII., mounted with heavy cannon, and commanding the approach to the harbour from the eastward; and on the eastern point, at the entrance to Langston harbour, which it commands, is Fort Cumberland, a large fort, erected in 1746, and mounted with 100 heavy guns. The entrance to the island from the north is defended by lines, carried along the bank of the channel which separates the island from the mainland, and by other works at Hilsea, four miles from Portsmouth. Fort Monkton, which commands the approach to the harbour from the west, corresponding in situation to Southsea Castle on the east, is not on Portsea Island, nor are the fortifications of the town of Gosport, on the shore of the harbour opposite Portsmouth, but both these may be considered as part of the system of defences which protect Portsmouth harbour.

PORTUGAL, THE KINGDOM OF, is the most westerly kingdom of Europe. It forms part of the Spanish peninsula, and is not divided from Spain by any well defined natural boundaries. All the great rivers of Portugal, the Minho, the Douro, the Tagus, and the Guadiana, have their sources in Spain, and belong to Portugal only in the lower part of their basins. The Mondego is the only considerable river which has its sources and its whole course within the limits of Portugal. Portugal is bounded on the north by the Spanish province of Galicia; on the east by the Spanish provinces of Leon, Estremadura, and Andalusia; and on the south and west by the ocean. Its greatest length is about 350 miles from north to south, and its breadth varies from 90 to 125 miles. Its area is reckoned at about 37,900 square miles, or about 10,000 square miles more than the area of Ireland. It has a coast-line of about 500 miles, of which about 400 miles face the west.

Mountains, &c.—The country is intersected by several ridges which are a continuation of the chains which cross Spain from east to west. In the north, the Serra de Maraon is a continuation of the mountains of Astorga, which divide the waters of the Minho from those of the Douro. It enters Portugal north of Braganza, and covers the greatest part of the province of Tras os Montes and part of that of Entre Douro e Minho. South of the Douro is the Serra de Alcoba, which divides the basin of the Douro from that of the Mondego; and south of the Mondego is the Serra de Estrella, a continuation of the Sierra de Gata, which is the western part of the great central ridge of Castile that divides the waters of the Douro from those of the Tagus and the Mondego. The Serra do Junto, which is a continuation of the Estrella, runs nearly parallel to the coast, and terminates in the high promontory called Cabo da Roca, the most western point of the continent of Europe. The highest summits of the Serra de Estrella are between 6000 and 6500 feet above the sea. South of the Tagus, the Sierra de San Pedro, a continuation of the Montanas de Toledo, enters Portugal near Portalegre, and divides the basin of the Tagus from that of the Guadiana. Farther south is the Serra de Monchique, which may be called a continuation of the Sierra Morena, being separated from it only by the course of the Guadiana. The great chains of the Portuguese mountains have a general inclination from north-east to south-west, and they throw off numerous offsets, which cover a great part of the country. Between these chains are the three great basins of the Douro, Mondego, and Tagus. [BEIRA; ESTREMADURA (Portuguese).] South of the Tagus is the plain of Alemtejo, the largest in Portugal, which is divided on the south-east by the mountains of Portalegre, Estremoz, and Evora from the basin of the Guadiana, which, differing in this respect from the other great rivers of Portugal, has a general direction from north to south, and belongs, even in its lower course, partly to Portugal and partly to Spain. The province of Algarve, situated at the southern extremity of the kingdom, is separated from the rest by the Serra de Monchique, and forms a strip of land between the mountains and the sea, which has a general slope to the south, and is traversed by numerous torrents running from north to south.

Climate, Products, &c.—The climate of Portugal presents considerable variations in the northern and the southern provinces. The southern provinces are very hot in summer and are subject to droughts; upon the whole however the climate may be said to be healthy, with the exception of a few spots south of the Tagus and near Setubal. The products of the country are—corn, Indian corn, rice, hemp, flax, honey, wax, plenty of fruits, especially excellent oranges and lemons, almonds, and abundance of good wine. The sea along the coasts and the rivers abound with fish, which is a great article of food with all classes. Sea-salt is collected in various places, particularly in the lagoon of Setubal. The sheep supply abundance of wool, of which some is equal to that of the Spanish merinos in fineness. Portugal has mines of copper, tin, and iron, of which only some of iron are worked. The manufactured articles are coarse woollen cloths in Alemtejo and Beira; linens in Minho, Beira, and Tras os Montes; silks at Campo Grande near Lisbon, and also at Oporto and Braganza; jewellery at Lisbon and Oporto. There are glass-works at Marinha Grande; paper manufactories at Alemquer, Lisbon, and Guimaraens; potteries at Lisbon, Oporto, Coimbra, Beja, Estremoz, and Caldas; cotton manufactories at Alcobaça and Thomar; and tanneries in various parts.

Population.—The population of Portugal was estimated at about three millions in 1827, but there has been no census in the present century.

The population of Portugal proper resembles in appearance and manners that of some of the neighbouring provinces of Spain, especially of Galicia, the dialect of the Gallegos being also akin to the Portuguese language. But the Portuguese differ considerably from their neighbours of Castile and Leon, both in their manners and character, and the difference has forcibly struck most travellers who have crossed the eastern frontier of Portugal, which in several places is not marked by any geographical boundary. On the Portuguese side of the line the villages are wretched in the extreme; the inhabitants are filthy both in their houses and persons, and the peasants seem dejected, indolent, and spiritless. The Spanish villages on the other side are comparatively clean, and the Spanish peasants look manly, robust, and active. People have endeavoured to find a reason for this difference in the municipal or rather communal institutions of Spain, which even under the absolute monarchy retained their original freedom. [AYUNTAMIENTO.] In some provinces of Portugal however, especially in the mountainous districts, such as Tras os Montes, the peasantry are superior in activity and spirit to the rest, and it was mostly from those districts that the fine regiments of light infantry called Caçadores were raised, which behaved so remarkably well throughout the Peninsular war.

With regard to the educated classes, those of Portugal are generally polished in their manners, courteous to strangers, insinuating, fond of conversation, and perhaps more pleasing in their outward address than the generality of the corresponding classes in Spain. The 'fidalgos,' or provincial nobility, are very numerous, though mostly poor.

Education.—Education in Portugal is lower than in Spain. The capital of the kingdom however is not wanting in those literary and scientific institutions which, in any well regulated country, are calculated to encourage and advance science. Besides an observatory, an establishment which has in some degree contributed to the advancement of astronomy, there are at Lisbon a royal naval school, an academy of civil and naval architecture, fortification and artillery, and drawing, painting, and sculpture; a college of surgeons, a commercial school, a royal military college, and another where the modern and antient languages, together with geometry, physics, and philosophy, are taught. The Royal Academy of Sciences, which holds the first rank among the scientific institutions of the kingdom, likewise holds its sittings at Lisbon. A society for the encouragement of national industry was established in Lisbon during Dom Pedro's regency. There are also in the capital extensive public libraries, a botanical garden, a museum of natural history, and various other scientific collections; a musical seminary, and a college for Irish missionaries. Yet with all these advantages science and literature are now in Portugal at the lowest ebb. According to Balbi, there were only sixteen printing-offices in all Portugal in 1827; one in Coimbra, three in Oporto, and twelve in Lisbon, which three places were the only towns that contained libraries or establishments for the sale of books.

Revenue, Trade, &c.—The public revenue in 1837 was reckoned at a little more than two millions sterling, and the expenditure exceeded it by nearly half a million. The public debt was above sixteen millions sterling. The present revenue of Portugal arises chiefly from the customs. The foreign trade is principally in the hands of English merchants. Most of the Portuguese wines and other produce are consumed in England. The direct trade between the ports of Great Britain and those of Portugal was formerly carried on chiefly in English bottoms; but more recently nearly one-third of the ships engaged in this trade are Portuguese, and the trade with Ireland is almost wholly carried on in Portuguese vessels. Internal commerce suffers from the want of good roads. There are no canals, and the few rivers which are navigable are not so at all seasons. Of late years the useful arts have made some progress; but few if any of the products of Portuguese industry can enter into competition with the corresponding articles of foreign manufacture.

Navy and Army.—The navy of Portugal now consists of two ships of the line, four frigates, and some smaller vessels. During the fifteenth and sixteenth centuries it was the largest in the world. The Portuguese navy was almost entirely destroyed by the Dutch and the English in their wars with that country when it formed part of the Spanish dominions; and although it revived under the first sovereigns of the house of Braganza, it again declined, and is now reduced to its present low condition. The best sailors are from the Algarve and the Azores. There is no other naval station in the kingdom besides Lisbon, where there are an arsenal, dock, marine school, and other naval establishments. The land forces of Portugal have lately varied between 25,000 and 30,000 men, according as the rebels, who still hold out in the fastnesses of the Algarve, have risen to importance. The uniforms and accoutrements of the men resemble those of the British troops.

Religion.—The whole Portuguese nation professes the Roman Catholic religion. At the head of the clergy is the patriarch of Lisbon, who has five suffragan bishops, besides four foreign bishops, and the archbishops of Braga in the north and Evora in the south, who have each four suffragan bishops. The monastic clergy previous to the late revolutions do not appear to have been so numerous as was generally supposed by foreigners. It is stated in a work published towards the end of the last century, to have consisted of about eight thousand monks. Among the Portuguese convents, four were rich, namely, those of Alcobaça, Thomar, Mafra, and Santa Cruz of Coimbra. One half of the remainder were of the mendicant orders, and the rest had a limited income just sufficient for the subsistence of their inmates. Such is the statement of the work above mentioned, which gives the monastic statistics of Portugal as they were at the end of the last century. (*Os Frades Julgados no Tribunal da Razão; Obra Posthuma da F. Doutor Conimbricense.*) 'The very hospitality,' observes the author, 'for which monasteries have long been famed, has given occasion to slander against them. Foreign travellers of distinction, who had no local knowledge of persons and things, being occasionally received in monastic houses and treated according to their rank, have assumed that the inmates lived generally in the same style as they treat their distinguished guests. Had they shared the common fare of the refectory, they would have formed a different judgment. The convents of men were suppressed in May, 1834, by Dom Pedro, the father of the present queen of Portugal, and their property has been annexed to the domain of the state. The monks are allowed a small pittance from the treasury.

Though catholicism is the religion of the state in Portugal, and the new constitution contains no article allowing any other worship, other creeds are tolerated, and the English merchants who reside at Lisbon, Oporto, and other commercial towns are nowise molested.

Political Divisions.—Portugal and the Algarve were divided for administrative purposes into six provinces, namely, ENTRE DOURO E MINHO, TRAS OS MONTES, BEIRA, ESTREMADURA, ALENTEJO, ALGARVE. Each province was divided into comarcas, and each comarca into parishes. A description of each province is given under its proper head. The Cortes have lately made a new territorial division of the kingdom into twelve provinces, which are subdivided into twenty-six comarcas, which are again further divided into julgados.

Government and Constitution.—During the middle ages feudalism was as prevalent in Portugal as in Spain, but the king was less restrained than in any other kingdom in the Peninsula; for though Portugal had very early popular representation, the deputies of the towns were fewer, not so well organised as a political body, and consequently much less influential than in Castile or Aragon. The first instance of popular representation in Portugal occurred in 1143, when the three estates met at Lamego, to confirm Alfonso I. in the title of king, which he had received from the soldiers after the battle of Ourique. Again, in 1181, and in the lifetime of Alfonso, the Cortes met, and gave the nation the celebrated code and constitution known as the 'Laws of Lamego.' By this constitution the crown was made hereditary in the royal family, but could pass to the collateral lines only with the consent of the estates. If the king left no male issue, the succession devolved on the eldest daughter, provided she married a native prince or a noble; but if she gave her hand to a foreigner, she was *ipso facto* excluded from the throne. Hence Beatrix, daughter of Ferdinand, was deprived of the succession for having married Juan I. of Castile. But the Cortes of Portugal, like those of other states in the Peninsula, fell by the repeated attacks and encroachments of the crown and the inability or unwillingness of the people to defend their rights. The kings of the house of Braganza ruled as despotically as their predecessors, and the constitutional liberties of Portugal were forgotten. At last, in 1820, after a momentary adoption of the Spanish constitution, a new one was framed, the principal features of which were a conditional veto in the king, only one chamber, and the election of the deputies to be made by electors chosen by the people from among all landholders paying a direct tax of about ten shillings. This constitution was abolished in 1823. In June, 1824, John VI. issued a decree reviving the old constitution, and summoning the Cortes of Lamego; but the Spanish government, fearing that the example of Portugal might awaken a similar feeling among their subjects, opposed the measure, and it was never carried into effect. In April, 1826, Dom Pedro granted his subjects a constitution, which established two chambers (the members of the higher being hereditary), and in other respects resembled the French charter. Though more monarchical in its tendency than that of 1820, the *carta* of Dom Pedro satisfied the enlightened part of the nation; but it was strongly opposed by the *Septembristas*, or partisans of the old one, who more than once succeeded in overturning it and re-establishing the old form of government. At last, in 1836, another constitution, neither so free as the former nor so monarchical as the latter, was sanctioned by the Cortes. This constitution establishes two chambers, both elective, and determines that no citizen can be an elector unless he possesses an income of 80,000 reis (20*l.*) arising from landed property.

By the separation of Brazil, the Portuguese monarchy has been shorn of the brightest jewel of its crown. The remaining dependencies of Portugal are—1, the Azores; 2, Madeira and Porto Santo; 3, the islands of Cape Verd [Verde]; 4, the islands of San Thome and Do Principe; 5, the captaincy or government of Congo or Angola; 6, the government of Mozambique on the eastern coast of Africa; 7, the government of Goa in the East Indies; 8, that of Macao on the coast of China; 9, some small settlements at Timor and other neighbouring islands: all these are described under the above heads. Most of these Portuguese settlements, especially those on the coast of Africa, are in a state of decay. The wretched state, both physical and moral, of those on the Mozambique coast, is well depicted in Captain Owen's 'Narrative of Voyages to explore the coasts of Africa, Arabia, and Madagascar.' It is impossible to ascertain the population of all these dependencies, some of which, such as Congo and Mozambique, include large inland tracts of country, which are only nominally subject to the Portuguese.

(Miñano, *Diccionario Geografico de España y Portugal*; Balbi, *Statistique du Portugal*; Kinsey, *Portugal illustrated.*)

History.—The early history of Portugal cannot conveniently be separated from that of the other kingdoms in the Peninsula. The Iberians and the Celts were the oldest inhabitants of the country; and it is to be inferred that the Phœnicians, who settled among the Turdetani, likewise visited its shores. When the Carthaginians invaded the Peninsula, their general Hamilcar overran and subdued its western provinces. The Romans, who succeeded the Carthaginians as masters of the Peninsula, governed by their prætors the province of Lusitania, the antient limits of which have been variously defined by different authors. Strabo (iii., p. 152) intimates that it extended from the Tagus to the Ocean on the north and on the west, and was bounded on the east by the Carpetani, Vettones, Vacæi, and Callaici. But when Augustus had divided the Peninsula into three provinces, Bætica, Tarraconensis, and Lusitania, the last only comprised the country between the Douro (Durius) and the Guadiana (Anas), extending on the eastern side as far as Libora (now Talavera) and Augustobriga (now Puente del Arzobispo) on the Tagus, or the frontiers of the Vettones and Carpetani. It thus comprised the greater part of the modern kingdom of Portugal, besides a considerable portion of Leon and Estremadura. This region was inhabited by various nations, of whom the principal were the Lusitani, Artabri, Celtici, Turduli, &c. [Spain], all of whom were rude but warlike people, who made several attempts to shake off the yoke of the republic. Viriatus, who contended so long and successfully with the best Roman legions, was a Lusitanian shepherd. When Spain was inundated by the Germanic tribes, Portugal shared in the general devastation; and when, at the beginning of the eighth century, the torrent of Arabian conquest spread over the Peninsula, the territories and towns of Portugal were as easily subdued as the remainder of Spain. [Moors; Musa.]

During the first century after the Saracen invasion, Portugal in the hands of the unbelievers shared the fate of the rest of Spain. In the ninth century however the greater part of northern Portugal was wrested from the Mohammedans, and became subject to local governors dependent on the counts of Galicia. The south still remained in the hands of the Mohammedans until towards the close of the twelfth century, when Santarem, Lisbon, and Cintra were reduced by Alfonso VI., the conqueror of Toledo. As these conquests however were continually exposed to the irruptions of the Almoravides, that monarch, in 1095, conferred upon his son-in-law Henry of Besançon, who was descended in a direct line from Hugues Capet, the government of the subdued territories from the Minho to the Tagus, with the title of count. At the same time Henry, who took up his residence at Guimaraens, was permitted to hold in his own right whatever conquests he might make from the Moors beyond the Tagus. In this manner he reduced most of the Mohammedan governors of fortresses south and east of the Tagus to the condition of tributaries. On his death in 1112, his son Alfonso succeeded to the dignity of count, which the Castilian king had previously rendered hereditary in his family. The new count proved a more formidable enemy to the Mohammedans than even his father. In 1139, having resolved to reduce the Moorish fortresses west of the Guadiana, he assembled a powerful army at Coimbra, and advanced towards Badajoz, the governor of which place, having received considerable reinforcements from Africa, hastened to meet him. The Moors were however defeated with great loss at Ourique in 1139.

Portugal under the Kings of the House of Burgundy (1139-1557).—After the victory of Ourique, Alfonso, who had for some time contemplated throwing off his allegiance to his lawful sovereign, caused himself to be proclaimed king by the soldiers. The cortes of Lamego confirmed his title, and gave to the new kingdom, which was acknowledged by the pope Alexander III., a code of laws and a constitution. In 1146 Alfonso retook Santarem from the Moors, and, soon after (1147), Lisbon with the assistance of a fleet of crusaders under the command of William Longsword [Lisbon.] In 1162 he founded the two military orders of Avis and San Miguel del Ala, which still exist. The remainder of his reign was spent either in war with the Moors, or in defending his dominions against the kings of Leon and Castile, who disputed his claim to the royal dignity. This king, whose memory is held in the greatest veneration by the Portuguese, died at the close of the year 1185. He was succeeded by Sancho I., his eldest surviving son, whose reign was by no means so glorious. Though with the aid of some crusaders, whom a tempest forced to take refuge in the port of Lisbon, he took the town of Silves in Algarve: and though he afterwards defended his conquest with success against the Almohades in 1190, he nevertheless lost Palmella, Alcaçar do Sal, Coimbra, and other important fortresses; some of which he did not recover for a long time. Sancho died in 1211. His successor, Alfonso II., had at first to sustain a war against the king of Leon, who penetrated into his dominions; but a peace being concluded, he gave all his attention to the prosecution of the war against the Mohammedans. Though he was not present at the battle of Tolosa (1212), he nevertheless sent to Alfonso III. of Castile his contingent of troops. In 1217 the arrival of another fleet of crusaders in his port led him to undertake, with their aid, the siege of Alcaçar do Sal, and after a blockade of several months, and a battle fought under its walls, that important fortress was again recovered. This conquest was followed by that of Moura and other towns in Alentejo. His son Sancho II., who succeeded him in 1223, was animated by the same military ardour. Soon after his accession he recovered Elvas, Jarumeñha, and Serpa. He then carried the war into Algarve, and was victorious in several partial engagements. He also made successful incursions into Alentejo, which he appears to have completely delivered from the infidels. At the same time the knights of Santiago, to whom he had entrusted the defence of the frontier fortresses, reduced Tavira, Faro, Loule, and other towns in Algarve. The populous city of Silves, which had been regained by the Mohammedans, was likewise recovered by the knights of that Order. In 1245 Sancho, having become highly unpopular with the clergy, whose privileges he attacked, an application was made by them to Innocent IV., who was then presiding over a general council at Lyon, and who, in concert with the fathers, issued a decree, by which, though the royal title was left to Sancho, the administration of the kingdom was declared to be vested in the Infante Alfonso, brother of the king. After some unsuccessful attempts to resist the papal decree, the dethroned monarch retired to Toledo, where he ended his days early in 1248. Alfonso III. completed the conquest of Algarve, which his predecessor had begun, and was thence called the 'Restorer.' Though he owed his throne to a decision of the holy see, he showed as little disposition as his brother to comply with its demands. The whole of his reign was passed in disputes, either with his prelates, whose religious privileges he sought to curtail, or with the military orders, whose possessions had from conquest become too large. In both instances however he was forced to yield. Alfonso died in 1279, and was succeeded by his son Dinis, who, like his father and most of his predecessors, was long at war with the church. Having at last convoked a meeting of his prelates, he effected a reconciliation with the church by yielding in most points, though he was completely successful in the main one, namely, that no order of ecclesiastics should be allowed to hold land in his kingdom. The reign of Dinis was not signalised by foreign conquest; the Mohammedans being then reduced, through the activity of Ferdinand III., to the limits of the kingdom of Granada. He had however to contend with his rebellious son Alfonso, who, aided by a turbulent and discontented nobility, more than once took the field against him. The name of Dinis has passed to posterity coupled with the glorious epithets of 'the just,' 'the husbandman,' and 'the father of his country.' He was the first who turned to account the favourable position of the country for commerce, and who, by awaking the enterprise of his subjects, laid the foundation of the greatness of Portugal in the succeeding century. Himself a scholar and a poet, he was a generous patron of science, which he fostered in his states. In 1284 he laid the foundation of a university in Lisbon, which he afterwards (1308) transferred to Coimbra. With the confiscated possessions of the Templars, he founded and endowed the new military order of Christ.

Dinis was succeeded, in 1325, by his son Alfonso IV., surnamed the Brave, whose reign was almost entirely spent in war with his namesake of Castile. Peace being at last concluded between them by the interference of the pope, he joined his arms to those of his rival, and assisted him in humbling the power of the Mohammedans, who, reinforced by their African neighbours, threatened once more to accomplish the entire subjugation of the Peninsula. His son Pedro I., who succeeded him in 1357, is chiefly known by his secret marriage with the celebrated Inés de Castro, and the tissue of crimes caused by that union. He was succeeded in 1367 by his son Fernando I., who, on the death of Pedro the Cruel of Castile without male heirs, assumed the regal title and arms of that kingdom, as the grandson of the Princess Beatrix, daughter of Sancho the Brave of Castile. His entire reign was spent in war with the bastard Enrique, who had usurped the throne of Castile; but though he wasted his resources, he gained no advantages. With the death of this monarch, in 1383, the male line of the Burgundian princes became extinct in Portugal. His daughter Beatrix, who had married Juan I. of Castile, was the true heir to the throne, but the Portuguese were so averse to a connection with Castile, that, on the marriage of the princess with the Castilian king, it had been expressly stipulated that in case of Fernando's death the government should be vested in a regency until Beatrix had a son capable of assuming the sovereignty. Accordingly Dom Joam, grand-master of the order of Avis, an illegitimate son of king Pedro I., was appointed regent, and two years afterwards was proclaimed king by the states assembled at Coimbra in 1385, to the prejudice of Enrique, son of Beatrix, the lawful heir to the Portuguese throne. Joam I. maintained the possession of his usurped throne with great ability and courage. After several successful encounters with the troops of the Castilian king, he defeated them with great loss at Aljubarrota, a village in Portuguese Estremadura (August 14, 1385). With this king begins the native line of Portuguese kings, as well as the foreign conquests and voyages of discovery which established the greatness of Portugal. The important fortress of Ceuta was wrested from the Moors in 1415. Henry, surnamed the Navigator, one of the king's sons, who had made the mathematical sciences and navigation almost his sole study, first set on foot those enterprises of discovery and commerce which raised Portugal so much above contemporary states. He made a first voyage of discovery in 1419, which proved unsuccessful. In the following year, with three vessels, he reached the Madeiras, which had been previously discovered by Machin, an Englishman. A subsequent expedition penetrated as far south as Sierra Leona, within three degrees of the line. The reign of Joam I. is justly considered one of the most glorious which Portugal ever had. He improved the administration of the kingdom, and introduced many salutary reforms into the courts of justice. He transferred the royal residence from Coimbra to Lisbon. At his death in 1433, Joam I. was succeeded by Duarte, under whose reign happened the disastrous expedition against Tangiers, in which the Portuguese lost an army, besides one of their leaders, the Infante Dom Fernando, who remained a prisoner in the hands of the Moors (1437).

Duarte, who died of the plague at Tomar, was succeeded by his eldest son Alfonso V.; but as he was only six years of age on his father's death, the regency devolved, according to his will, upon the queen-mother, a very able princess. Under the reign of this king the career of African conquest was ardently prosecuted. The port of Alcaçar Saguer, on the African coast, was invested and taken in 1457. Arsilla, a port on the Atlantic, was next stormed, and the inhabitants were put to the sword (1471). The populous city of Tangiers, which had hitherto defied all the power of Portugal, was next reduced, chiefly through the instrumentality of his eldest son Joam, who for his gallant behaviour on this occasion received the honour of knighthood. Towards the close of his reign Alfonso was induced to favour the pretensions of La Beltraneja to the throne of Castile, and to make war upon Ferdinand and Isabella, whom he considered as usurpers. But his troops having been completely routed at Toro, in 1476, he was obliged to accept peace on very humiliating conditions (1479). Alfonso died of the plague in 1481. He founded the order of the Tower and Sword. He was a great patron of literature, and the first Portuguese king who collected a library, and ordered the national history to be treated by competent writers. His reign was likewise signalised by the progress of maritime discovery, and the Azores, with the Madeiras, the Canaries, Cape Verd, and other islands west of the African continent, were either discovered or colonised through the persevering efforts of the Infante Dom Enrique. Joam II., who succeeded Alfonso II., was justly considered one of the ablest monarchs that ever sat on the throne of Portugal. He was the first who coped with the nobles, whose power had greatly increased under his predecessors. All grants of crown-lands made by his indulgent predecessors were revoked, and the judicial privileges of the nobility were restricted by the appointment of plebeians to all the magistracies. Some attempts having been made by the nobles to resist the king's orders, the duke of Braganza, who was their representative, was beheaded in 1463, and the duke of Viseo was put to death by the king's own hand in 1483. In this reign the Portuguese spirit of maritime discovery was carried to the highest pitch. A fort was built on the coast of Guinea, which had been discovered under the reign of his predecessor, for the purpose of maintaining a permanent commercial intercourse with the natives, and from this moment Portugal derived from that coast a considerable profit in ivory and gold, which supplied ample resources for new enterprises. This active spirit received fresh impulse from the capital and industry of the Spanish Jews, 83,000 in number, whom the intolerant rigour of Ferdinand and Isabella had driven from their dominions, and who were admitted in Portugal on the payment of a capitation tax.

In 1481, Joam, having conceived that by coasting along the African continent a passage to the East Indies might be discovered, dispatched two of his subjects, Pedro da Covilhan and Alfonso da Payva, into India and Abyssinia, to discover the route to and between these vast regions, and learn what advantages Portuguese commerce might derive from the knowledge thus acquired. After reaching Alexandria, the two travellers separated, Covilhan for India, Da Payva for Abyssinia, agreeing to rejoin each other in a given period at Cairo. Covilhan embarked on the Red Sea, and visited the most famous cities of India as far as the Ganges. On his return he sailed along the shores of Persia, Arabia, and Africa, as far as Mozambique, where he learned that the continent terminated in a great cape. Having heard at Cairo of his companion's death, he settled in Abyssinia, whence he wrote to the king, and sent him a chart of the maritime places that he had visited. These discoveries encouraged Joam to attempt a passage to India. The kingdoms of Benin and Congo were first discovered, the former by Joam Alfonso de Aveiro, the latter by Jayme Cam. [BENIN; CONGO.] The Portuguese next formed a settlement on the coast of Senegal, the king of which country had previously visited Lisbon. At last, in 1487, an enterprising officer named Bartholomeo Diaz discovered and doubled the southern cape of Africa, which, from the good expectations which it encouraged, was called O Cabo de Boa Esperanza. [CAPE OF GOOD HOPE; AFRICA.] The success of these expeditions, and the wealth which the commerce of the newly discovered countries poured into Portugal, may perhaps be some excuse for the neglect with which the proposals of Columbus to seek new lands in the west were received at the Portuguese court. However, no sooner was the happy issue of the Genoese pilot's discovery made known in Portugal, than Joam fitted out a fleet for the West. This led to a dispute between Portugal and Castile, which Pope Alexander VI. finally settled by a line of demarcation drawn one hundred leagues west of the Azores and Cape Verd Islands, thus separating the future conquests of the two nations. [COLUMBUS; AMERICA.] Joam II. died universally regretted, in 1495. He was succeeded by his cousin Manoel, who steadily pursued the career of maritime discovery.

About the close of 1497 the passage to India by sea was effected by a squadron of five vessels, under the orders of Vasco de Gama, who returned to Lisbon, in September, 1499, after an absence of little more than two years. A fleet of thirteen vessels was next fitted out and sent in the same route, under the direction of Pedro Alvares Cabral, who discovered Brazil, and touched afterwards at Quiloa, Calicut, Cochin, and Cananor, with which countries he opened an intercourse. In 1502, Vasco de Gama, being sent to India a second time, with ten sail, permanently established the Portuguese authority in India. [GAMA, VASCO DE.] The next considerable armament which the Portuguese king fitted out for India consisted of thirteen vessels and 1200 men, which were put under the orders of Lope Suares. Soon after Francisco da Almeida was sent to administer the Portuguese conquests in India. His son Lourenzo took possession of the Maldive Islands, and established factories in Ceylon, while other expeditions, sent in various directions, formed commercial establishments on the island of Sumatra, as well as at Malacca. Alfonso da Albuquerque, by whom Almeida was replaced, was one of the ablest captains of his age, and the Portuguese flag waved triumphantly along the vast African continent from the Straits of Gibraltar to Abyssinia, and along the Asiatic from Ormuz to Siam. [ALBUQUERQUE.] On this distant stage were performed many acts of heroism, which gave a tone to the national character. The conquests in Northern Africa, though unprofitable, contributed to keep up the martial spirit of the Portuguese. Lisbon became the most important commercial city of Europe; and Portugal, the most insignificant of the European states in extent of territory and population, grew a powerful monarchy.

In the reign of Joam III., who succeeded his father Manoel in 1521, Indian discoveries and commerce were still further extended. But the rapid accumulation of the precious metals at home without a corresponding increase of domestic industry, and the loss of so many of her most vigorous youth, who were sent to extend or defend her conquests, began to be as sensibly felt in Portugal as they afterwards were in Spain. The introduction of the Inquisition, in 1536, which, as in Spain, was at first intended only against the Jews, greatly contributed to increase the misery caused by bad administration and the vicious course of policy pursued with regard to the colonies. The enlightened Joam II. had allowed the Jews to settle in his dominions, but he had subsequently been persuaded by his wife, a daughter of Isabella, to revoke his permission, and to issue an order that all the Jews living in Portugal should embrace Christianity in the course of twenty years, under the penalty of being deprived of their children and made slaves. Many thousands having been induced by this measure to conform publicly at least to the Christian usages, while they secretly adhered to their faith, the Inquisition began to search out the delinquents, against whom, when discovered, the most revolting cruelties were practised. The Jews were exterminated, or fled from Portugal: but although the object for which that tribunal was instituted no longer existed, it still continued a powerful political weapon in the hands of the absolute kings of Portugal. [OFFICE, HOLY.] As injurious in its consequences as the Inquisition was the admission of the Jesuits into Portugal, under Joam, the first European monarch who permitted them to enter his dominions. [JESUITS; LOYOLA.] The education of his grandson Sebastian, the heir-apparent to the throne, was likewise entrusted to the Jesuits, who inspired the young prince with that spirit of bigotry and that fanatical ambition which led to his death. In 1557, on the death of his grandfather, Sebastian being only three years old, the regency was vested in the widowed queen Catherine of Austria. Scarcely however had the young prince reached his fourteenth year—the period of his majority—when he began to turn all his thoughts towards the prosecution of the African war; and he sailed in 1574, in opposition to the remonstrances of his wiser counsellors. Four years afterwards, in August, 1578, the memorable battle was fought by which Portugal lost her king, and began rapidly to sink from her former prosperous condition.

Portugal subject to Spain (1580-1641).—After the short reign of Cardinal Enrique, Sebastian's uncle, who was proclaimed in 1578 and died in 1580, Philip II. of Spain, the most powerful candidate for the throne, obtained possession of it, not without considerable opposition on the part of the Portuguese, who, rather than submit to the Spanish yoke, elected Dom Antono, prior of Crato, a bastard of Dom Luis, brother of Joam III. Portugal thus became annexed to a kingdom which from this time was hastening to its own decline by a series of unsuccessful wars and by its unwise administration. England and Holland, the powerful enemies of Spain, now attacked Portugal, the wealth of which promised them a rich booty, and whose defenceless maritime possessions were gradually torn away. The Dutch took the Moluccas and a great portion of Brazil in 1624. They likewise took possession of the Portuguese settlements on the coast of Guinea (1637), and forced their way into the rich markets of the East Indies. Spain, then at war with the European states, could not attend to the defence of those distant possessions, and the colonies of Portugal were one by one wrested from her by her active enemies the English and the Dutch. The internal administration of that kingdom was in the hands of Spanish governors, who made themselves obnoxious by their rapacity and injustice. At last the Portuguese nobility, exasperated by this oppression and the contemptuous conduct of Olivarez, the minister of Philip IV., entered into a conspiracy, and on the 1st of December, 1640, Joam de Braganza, a descendant of the old royal family, was placed on the throne. In justification of this revolution, which restored the independence of Portugal, the Cortes of 1641 issued a manifesto addressed to the powers of Europe. The war with Spain, which was the result of this measure, and lasted during the reign of Joam, as well as that of his son Alfonso VI., was terminated in 1668, by a treaty of peace, and a cession on the part of Spain of all her claims on Portugal.

Portugal under the Monarchs of the House of Braganza (1641-1840).—Joam IV., the first Portuguese king of the house of Braganza, died in 1656. He was succeeded by his son Alfonso VI., who completed the work begun by his father and firmly established Portuguese independence. A treaty of peace was also concluded with Holland by English mediation, by which Brazil was restored to Portugal; but its former greatness could not have been restored, even had the princes of the line of Braganza displayed more wisdom and vigour than they actually did. Pedro II., who succeeded his brother Alfonso IV. in 1683, took part with the allies against Philip V. of Spain. From this time date the relations and alliance of England with Portugal. A commercial treaty with that kingdom had already been made, under the first sovereign of the house of Braganza. A new one was concluded in 1703 by the English ambassador Mr. Methuen, which secured to England the advantages of the newly discovered mines in Brazil. During the long reign of Joam V., which lasted from 1707 to 1750, some vigour was displayed in regard to the foreign relations, and several attempts were made for the promotion of the national welfare at home, such as the restriction of the powers of the inquisition, and the increase of the revenue by encouragement of trade and manufactures. But that institution was too formidable an adversary to allow the object to be accomplished; and although the resources of the country were really increased, immense sums were thrown away on the sumptuous monastery at Mafra and the dear-bought permission from the pope to institute a patriarch of Lisbon. Under his son and successor Jossé I., who ascended the throne of Portugal in 1750, the spirit of reform and improvement, which had sprung up in Spain, became also visible in Portugal. His minister, the marquis of Pombal, a vigorous reformer, followed the steps of Aranda and Floridablanca, who, with equal success, were healing the wounds which bad administration had inflicted upon their own country. The Jesuits and the nobility, who under the preceding reign had exercised a secret and dangerous influence, were vigorously attacked. The exposure of the power which the former had usurped in Paraguay—their conduct at the time of the earthquake, which in November, 1755, laid so great a portion of the capital in ruins—the conspiracy against the life of the king (a charge however which appears destitute of all foundation) in 1759—led at last to the suppression of the Order. In 1757 they had been deprived of the post of confessors to the royal family and forbidden the court; two years after, they were banished from the kingdom and their estates confiscated, a measure which was readily imitated a few years afterwards (1766) by their neighbours of the Peninsula. [Jesuits.]

On the accession of Maria Francisca Isabel, eldest daughter of Jossé, in 1777, the marquis of Pombal lost the influence that he had possessed. To him Portugal owed her revival from a state of lethargy, and although most of the useful regulations which he introduced did not survive his fall, yet the enlightened views which he disseminated, and the national feeling which he awakened, were not without permanent effects. During the reign of Maria, the power remained almost entirely in the hands of an ignorant nobility and of a still more ignorant and ambitious clergy. In 1789, on account of a serious indisposition of the queen, her eldest son, Joam Maria Jossé, prince of Brazil (the title of the prince royal until 1816), was declared regent, and soon after, her malady having terminated in mental alienation, the prince was declared regent with full regal powers. The connection of Portugal with England involved Joam VI. in the wars against France; but in 1797, the commercial distress, the accumulating debt, and the threatening language of Spain, now in the interests of France, led to a peace with that power. The disasters of the French arms in 1799 encouraged the regent to renew hostilities, in alliance with England and Russia; but French politics again preponderating in Madrid, the Prince de la Paix (Godoy), then prime minister, was persuaded to declare war against Portugal, which kingdom he invaded in 1801. Hostilities however terminated the same year, by the treaty of Badajos, by which Portugal was obliged to cede to Spain the important fortress of Olivenza, besides paying a large sum of money as indemnity for the expenses of the war. Portugal, in the meantime, preserved a mere shadow of independence by the greatest sacrifices, until at last General Junot entered that country, and the house of Braganza was declared by Napoleon to have forfeited the throne, owing to the refusal of Joam VI. to seize the British merchandise in his dominions. The regent now put himself entirely under the protection of the English, and in November, 1807, embarked for Brazil. Junot entered the capital on the next day, and Portugal was in every respect treated as a conquered country. In order to oppose the French, a British force was landed, and numerous bodies of native troops in the northern provinces, having taken up arms, prepared to maintain their independence. A junta was in the meanwhile established at Oporto to conduct the government. After some partial engagements, the decisive battle of Vimeira was fought, 21st of August, 1808, in which the British troops, under Sir Arthur Wellesley (now duke of Wellington), defeated the French under Junot. This signal victory was followed by the celebrated convention of Cintra, and the evacuation of the country by the French forces.

The Portuguese now took an active part in the Peninsular war. On the death of Maria Isabella (1810), John VI. was called to the throne of Portugal, which he occupied conjointly with that of Brazil, where he continued to reside. This removal of the court to an American colony was not without consequences. Brazil attempted to withdraw itself from dependence on Great Britain, and became in the sequel a separate state. In Portugal, on the contrary, the influence of England continued, and the condition of the kingdom was not essentially changed. The peace of Paris, in 1814, by no means answered the expectations of the nation, though it had exerted itself vigorously in the common cause. Spain succeeded in evading the restitution of Olivenza, which had been provided for by the Congress of Vienna, whilst Portugal was obliged to restore some part of French Guiana, which had been taken from the French. The court of Rio Janeiro therefore occupied the Banda Oriental [Brazil], and Portugal was involved in new difficulties with Spain. In 1815 the Inquisition was for ever abolished in the Portuguese dominions, and the Jesuits were refused admission into them, while the Jews were, at the request of the pope, in 1817, allowed the same privileges which they enjoyed in the Roman states.

On the 24th of August, 1820, the cry for liberty which was raised in Spain, was responded to in Portugal, and a Revolution commenced, in which the army and the citizens acted in concert. The soldiers were induced by their officers to swear obedience to the king, the Cortes, and the constitution which should be adopted. The magistrates and citizens declared also in favour of that measure, and a junta was established, which addressed a manifesto to the nation, stating that the convocation of a popular assembly and the adoption of a free form of government were the only means of saving the state. All the garrisons, from the Minho to Leiria, joined in the movement, which was not opposed by the troops of the regency established at Lisbon. At last, on the 15th of September, 1820, all the troops and the citizens of Lisbon unanimously proclaimed the constitution, and the cessation of the absolute government which had hitherto prevailed in Portugal. A provisional government was immediately established, which acted in union with the junta at Oporto. In the meantime Count Palmella, the head of the regency, was dispatched to Rio Janeiro with an account of what had passed, and a petition that the king Joam VI. or the prince royal Dom Pedro would return to Lisbon. The Revolution was unattended either by violence or bloodshed; but the liberal party, being desirous of adopting the Spanish constitution, obliged the supreme junta to administer to the civil authorities and to the army the oath of obedience to it. This measure however being disapproved by a considerable party of the people, four members of the junta and 150 officers resigned; upon which it was agreed that no part of the Spanish constitution should be enforced until it was acted upon by the Cortes, with the single exception of the law of elections, which was definitively adopted for the election of the first Cortes. The Cortes having assembled in 1821, under the presidency of the archbishop of Braga, various laws were passed, among which freedom of person and property, the liberty of the press, legal equality and the abolition of privileges, the admission of citizens to all offices, and the sovereignty of the people, were passed almost unanimously. With respect to the organization of the chambers and the royal veto, various opinions prevailed, but at last a large majority decided in favour of one house and a conditional veto.

After some disturbances in Brazil, Joam VI. sailed for Portugal, where he was not allowed to land until he had given his consent to several acts of the Cortes, which imposed restrictions on his power, and had sworn to observe the new constitution. The ambassadors of Russia and

Austria left the court; Brazil separated itself from Portugal; and the country was disturbed by various attempts in favour of the old system of government. In the meanwhile the constitution was completed by the legislative assembly, and publicly sworn to by the king on the 1st of October, 1822, but the Infante Dom Miguel, assisted by the Count of Amarante and other noblemen, resolved to overthrow it. The royalist forces under Amarante having been defeated, the insurgents took refuge in Spain, and in May, 1823, established at Valladolid a Portuguese regency, under the presidency of the patriarch of Lisbon, who had been banished from the kingdom. Dom Miguel, after insidiously assuring his father of his determination to uphold the constitution, repaired to Villafranca, where, being joined by some troops, he openly declared against the Cortes. The garrisons of some provincial towns having embraced his cause, John VI. was obliged to yield, and having appointed a new ministry, declared the constitution of 1822 null; the national guards were disarmed, the church property restored, the patriarch of Lisbon recalled, Count Amarante reinstated in his rank and rights, several members of the Cortes imprisoned or exiled, and the liberty of the press abolished. But Joam VI., who under any other circumstances would have been an excellent king, was unwilling altogether to deprive the Portuguese of a liberal government, and a commission was appointed, at the head of which was Palmella, to draw up a constitution adapted to a representative kingdom. This again failed through the intrigues of the apostolical party, supported by France and Spain; the queen returned to Lisbon, and Amarante made his entry into the capital, and was soon after created marquis of Chaves, the name of the town where he had organised his insurrection against the Cortes. Dom Miguel, who had been appointed commander-in-chief of the army, and invested with supreme power, filled the offices with men devoted to the cause of absolutism. He also meditated an expedition to Brazil, but an exhausted treasury prevented him from carrying his plan into execution. At last the absolutist party determined to annihilate the hopes of the constitutionalists, and to put an end to the system of moderation to which the king still adhered. On the 30th of April, 1824, Dom Miguel called the troops to arms, and issued a proclamation, in which he declared that it was his intention to deliver the king his father from the tyranny of the revolutionists who surrounded his person. By his orders the ministers and several public officers, to the number of about one hundred, were arrested on the charge of having engaged in a conspiracy against the life of the king. In the meantime the ambassadors of the foreign powers were not allowed to enter the presence of the king, who was closely watched; but having subsequently protested against this violence, Joam succeeded in escaping on board an English man-of-war at anchor in the Tagus, where, having sent for the diplomatic body, he deprived his son of command, and summoned him to his presence. Dom Miguel obeyed, confessed that he had been deceived and misguided, and received the royal pardon, with permission to travel. On the 14th of May the king returned ashore, and early in June proclaimed a sort of amnesty for the adherents of the Cortes of 1820. On the same day appeared a decree reviving the antient constitution of the state, and summoning the old Cortes of Lamego, which had not met since 1697, a measure which, being stoutly opposed by Spain, was not carried into execution. In 1825, after many difficulties and protracted negotiations, the independence of Brazil was finally acknowledged by Joam VI., who merely retained the imperial title.

Early in March, 1826, Joam VI. died, after having named the Infanta Isabel regent. She administered the kingdom in the name of Dom Pedro, the emperor of Brazil, as king of Portugal. On the 23rd of April, Pedro IV. granted the latter kingdom a constitution, which established two chambers, and in other respects resembled the French charter. On the 2nd of May however he abdicated the Portuguese throne in favour of Doña Maria da Gloria (he remaining king during her minority) on condition of her marrying her uncle Dom Miguel. But a party secretly favoured by Spain aimed at the overthrow of the constitution granted by Pedro, which had been sworn to by the queen, by the two chambers, by all the magistrates, and by Dom Miguel himself at Vienna in 1826. The marquis of Chaves and the marquis of Abrantes appeared at the head of an army of insurgents, and Spain assembled considerable forces on the Portuguese frontiers; but Portugal having appealed to England for assistance, 15,000 British troops were landed in Lisbon, and the insurrection was completely put down. In July, 1827, Pedro appointed his brother Miguel lieutenant and regent of the kingdom. The prince accordingly left Vienna, and passing through Paris and London, arrived at Lisbon in February, 1828, soon after which, in the presence of the two chambers, he took the oath to observe the charter. But the apostolical party, to whom the disposition and temper of the regent were well known, began openly to speak of Miguel's right to the throne, and to hail him as absolute king. It was determined that the regent should go to Villaviciosa on the Spanish frontier, where he might have the support of the troops under the marquis of Chaves, and overthrow the constitutional government. This project however was frustrated by the decision of Mr. Lamb, the British minister, who not only counteracted the order for the departure of the British troops then in Portugal, but prevented the payment of a loan made to Dom Miguel under the guarantee of the English government. At last, after dissolving the Cortes, who were opposed to his designs, and seeing the departure of the British troops, Dom Miguel issued a decree in his own name convoking the antient Cortes of Lamego. Part of the army however were not favourable to his projects, and on the 18th of May, Dom Pedro and the charter were proclaimed by the garrison of Oporto, which, being increased by other garrisons, marched against Lisbon. They were defeated towards the end of June, and the constitutionalists either forced their way to the Spanish frontier or embarked for Great Britain. Miguel now turned all his attention to the consolidation of his power. Having caused the Cortes to assemble (June, 1828), he was declared by that body lawful sovereign of Portugal and Algarve, chiefly on the grounds that Dom Pedro had forfeited all right to the crown, as well as to the appointment of a successor, by becoming a Brazilian citizen, and not residing in Portugal. On the 4th of July, 1826, Dom Miguel, in compliance with the decision of the Cortes, assumed the royal title. He immediately established a special commission to try all those who had taken any part in the Oporto insurrection; the prisons were crowded with individuals of all ranks, and foreign countries were filled with Portuguese emigrants. An expedition was likewise sent to those islands which refused to acknowledge his authority, all being reduced, with the exception of Terceira, where, in March, 1830, a regency, appointed by Dom Pedro, and consisting of Palmella, Villaflor, and Guerreiro, was installed. The other islands were soon retaken by the forces of the regency, and Dom Pedro having arrived in Europe, extensive preparations were made to dethrone the usurper. Meanwhile Portugal was a prey to violent political commotion. Insurrections broke out everywhere, trade was suspended, and the relations of Portugal with foreign powers were seriously compromised.

In consequence of some acts of violence against British subjects, and a refusal of redress on the part of the government, the English government sent out a fleet to the Tagus, but on its appearance before Lisbon, May, 1831, the concessions required by Great Britain were made. In July, in consequence of similar demands of the French government not being complied with, a French squadron forced the passage of the Tagus, and took possession of the Portuguese fleet, which was not restored until full satisfaction was given besides an indemnity for the expenses incurred by the expedition.

On the 24th of February, 1832, the naval forces of Dom Pedro arrived off Terceira, of which island they took possession in the name of Doña Maria, as lawful queen of Portugal. Three months after (June, 1832), an expedition 10,000 strong sailed from St. Michael's in the Azores, and on the 10th of July landed near Oporto, which city they took without opposition. The Miguelite forces laid siege to Oporto, but were defeated in several engagements by the troops of Dom Pedro, which were chiefly composed of Englishmen. After a siege of several months, during which the garrison was reduced to the greatest extremities, and the wealthy merchants in the city were almost ruined by the wanton devastation committed in their wine-vaults by the royalist troops, an expedition was fitted out by means of a loan raised in England, and Dom Pedro, encouraged by the recent victory won by Admiral Napier over the naval forces of Dom Miguel, sailed with part of his forces for Lisbon, of which he took possession with comparatively little trouble. He then established a permanent government, and shortly after sent to England for the young queen, who was received by the Portuguese nation with every demonstration of joy.

In the meantime the army of Dom Pedro prosecuted its success. Early in 1834 the strong town of Leiria was taken from the Miguelites by Marshal Saldanha; and in April a Spanish army, under General Rodil, entered Portugal for the purpose of seizing the person of the Infante Don Carlos, the pretender to the Spanish crown, who, with a few followers, had crossed over the frontier and taken refuge in Portugal. On the approach of the Spanish troops the important town of Almeida declared for the young queen. Shortly after a treaty was signed at Lisbon between England, France, Spain, and Portugal, which had for its object the pacification of Spain and Portugal by the expulsion of Don Carlos and Dom Miguel from the Portuguese territory. On the 26th of May, 1832, after the surrender of Santarem and other places, Dom Miguel was obliged to capitulate and sign the convention of Evora. He was however permitted to leave Portugal, and to embark at Monte for Genoa. This event ended the struggle, and the young queen was firmly seated on the throne of Portugal, the regency being conferred upon her father. One of the first acts of his administration was the suppression of the monastic establishments; another was the partial abolition of paper money, and the formation of a metallic currency. On the 15th of August Dom Pedro was confirmed in the regency by the Cortes, but in the following month the declining state of his health having induced him to resign his office, the Cortes in consequence declared the young queen of age. Having therefore taken the oath according to the charter, she assumed the full exercise of royal authority. Dom Pedro died on the 22nd of September, 1834. Soon after (January, 1835), Doña Maria married Duke Augustus of Leuchtenberg, who died shortly after (March, 1835), and in April, 1836, she married Prince Ferdinand of Saxe Coburg-Gotha, by whom she has issue Prince Pedro de Alcantara, born 16th of September, 1837, and Luis Felipe, born 31st of October, 1838.

Language.—The language of Portugal, like those of other kingdoms in the Peninsula, originated in a mixture of the Latin, Teutonic, and Arabic. Some writers have improperly called it a dialect of the Castilian; but, besides the striking difference in its structure and pronunciation, there can be no doubt that the Portuguese was formed earlier than the Castilian. It might more properly be called a dialect of the Galician, to which it had at first great affinity, and which it now resembles so much that the uneducated people of both countries perfectly understand each other. The *cantigas* of Alfonso X. were written in Galician, and long after the formation of the Castilian dialect Leonese and Castilian poets used the Galician or Portuguese dialect as more adapted to all kinds of poetical composition. The separation of Portugal from Spain, their wars, and the little commercial intercourse which existed between them during the middle ages, combined in course of time to make the Portuguese a different language. When Henry of Burgundy fixed his court at Guimaraens, the French knights who came with him introduced a considerable number of French words into the language of the country. The great efforts too of the Portuguese poets and prose writers in the fifteenth and sixteenth centuries to improve their native language by resisting the introduction of Castilian words, and anathematising all those who adopted the Spanish language in their writings, may be mentioned as one of the means which mainly contributed to render the tongues of Spain and Portugal still more dissimilar. The Spanish, like the Portuguese, has many words borrowed from the Arabic. Their wars with the Moors of Africa and the Mohammedans of India in the fifteenth century introduced into it many others from the languages spoken in those countries. Father Joao de Sousa published, in 1789, 4to., a vocabulary containing no less than 1400 words derived from the Eastern languages, chiefly from the Arabic. As a conversational language, the Portuguese is considered superior to the Spanish. It is more concise, easy, and simple, but not so rich. The pronunciation is difficult for a foreigner, more particularly the nasal sounds, in which it abounds. The gutturals however are neither so strong nor so common as in the Spanish; but it must be admitted that the clipping pronunciation of *o* and *a*, whenever these vowels occur at the end of a word; the articles *o* and *a* abbreviated from *lo* and *la*, together with the compounds formed from them, as *no* and *na* instead of *en lo* and *en la*; and the loss of that sonorous accentuation of the Spanish words by the change of *color*, *palazio*, *padre*, *madre*, &c. into *cor*, *paço*, *pay*, *may*, if they add in some manner to the fluency of the Portuguese, place it far beneath the stateliness and majesty of the Spanish. Sismondi has very wittily remarked that the Portuguese was only *un Castillan desossé* (a boneless Castilian). The *j* and the *ch* are the two sounds in which the Portuguese differs most from the Spanish; these letters are pronounced like the French, whom they also imitate in some nasal sounds, and in their mute endings. The best Portuguese grammar is that of Pedro Jozé de Figuereido ('Arte da Grammatica Portugueza,' Lisboa, 1799); and the best dictionary the revised edition of Bluteau, by Antonio de Moraes Silva, Lisboa, 1739, 2 vols. 4to. In 1793 the Academia Real das Sciencias of Lisbon undertook to publish a Portuguese dictionary, of which however only one volume has hitherto appeared, a thick folio, containing A, and embracing the fifth part of the words in the language.

Literature.—The literature of Portugal is complete without being very rich. In all branches there have been happy attempts; in none is there an abundance, except in lyric and bucolic poetry, in both which branches the Portuguese are richer than their neighbours of the Peninsula. Poetry comprises the most important part of their literature; prose and eloquence have been very little cultivated, owing to the intolerance of the government and the persecutions of the Inquisition. After the fifteenth century, poetry in Portugal became and remained bombastic and affected, and its antient power and natural grace were completely lost. In the time of Louis XIV. the French were copied, and many Gallicisms were admitted. Under Pombal, Portuguese literature revived, and poets strove to give elevation to the language. Prose too became more simple and pure by the imitation of the classics. That minister was the first who banished the scholastic logic and metaphysics from the lecture-rooms of Coimbra. The study of the antient languages was always and still continues to be neglected. There are not more than eight schools for the Greek language in all Portugal.

That Portuguese poetry flourished earlier than the Castilian is generally supposed from the fact of two poets, Gonzalo Hermiguez and Egaz Moñiz, having written in verse as early as the reign of Alfonso I., in the twelfth century. The few poetical fragments however of these antient bards which have been preserved by Faria e Sousa (*Europa Portugueza*, vol. iii., p. 378) are not wholly intelligible even to natives of Portugal. As no Spanish verses of that age by any known author are extant, the opinion entertained by Bouterwek (vol. ii., p. 3) that the prevailing tone of romantic love which characterised the poetry of the Spaniards and Portuguese, until the imitation of the Italian style was generally adopted, originated in Portugal, is not without foundation; although the supposition is rendered less probable by the fact that the Galician and Portuguese languages and poetry were originally, and even long after the separation of Portugal from the Castiles, scarcely distinguishable. In the same manner we might be inclined to think that the Portuguese also preceded the Spaniards in epic (or rather, historical) poetry, since an old Portuguese narrative in dactylic stanzas, quoted by Faria e Sousa, is unquestionably much older than any similar attempt of the Castilian poets. However, until the latter half of the thirteenth century, when the language became more regular and distinct, the rude attempts of the early poets of Portugal cannot be mentioned otherwise than as curious relics of antient times. King Dinis, who, like his contemporary Alfonso the Learned of Castile, was a poet and a prose writer himself, was the first to improve poetry and give an impulse to general literature. His poetical compositions were, according to the fashion of the age, collected in *cancioneiros*, which bore the name of the royal author. Under Alfonso IV., the son of Dinis, the taste for poetry increased. His verses however have never been printed, nor have those of Alfonso Sanchez, a natural son of Dinis. Pedro I., better known to English readers for his unfortunate connection with the beautiful Inés de Castro, wrote a poem in the Castilian language, in addition to some compositions in Portuguese. The Infante Dom Pedro, son of Joam I., is supposed to have translated some of Petrarch's sonnets. With the fifteenth century begins the flourishing period of Portuguese literature. A tender as well as heroic spirit, a fiery activity, a soft enthusiasm, war, love, and glory filled the whole nation; and the Portuguese poets sang in an heroic and romantic strain, of which the 'Cancioneiros Geraes' contain numerous specimens. The earliest of these was printed in 1516, by Garcia de Resende, who lived at the courts of Joam II. and Emmanuel the Great. A later collection, by Pedro Ribeyro, bearing the date of 1577, is still in manuscript. Another, discovered at Madrid, in 1790, by Joaquim Jossé Ferreira Gordo, comprising poems by a hundred and fifty writers of the fifteenth century, is known only by a short account of it in the 'Memorias da Litteratura Portugueza.' Bernardim Ribeyro, who flourished under Emmanuel the Great, and who is better known as the author of a romance in prose entitled 'Menina e Moça' (Lisboa, 1559 and 1785, 8vo.), was the first to write eclogues, which, when compared with those of Juan de la Encina, a Castilian poet, his contemporary, may in every respect claim superiority. This direction of taste gave rise to the numerous pastoral poets of Portugal during the fifteenth century. Christovão Falcão, a knight of the order of Christ, and governor of Madeira, was the author of a long eclogue of 900 verses, which was printed as an appendix to the works of Ribeyro. Several eminent poets imitated his example; and Portugal has not without reason been regarded as the native land of romantic pastoral poetry, which the Portuguese poet Jorge de Montemayor afterwards introduced into the literature of Spain. It is a remarkable fact that several distinguished poets of that age composed indifferently in the Portuguese and Castilian languages, but used the latter in preference, if they wished to treat great subjects. Saa de Miranda, who flourished towards the middle of the sixteenth century, and is the author of several eclogues and pastoral romances, besides two comedies and several epistles in imitation of those of Horace, is considered to be the introducer of the Italian style of poetry into Portugal, where it was quietly adopted, and without exciting the violent literary storm raised in Spain against its partisans. He was also the founder of a classical school, which was not without admirers and imitators. In this number may be enumerated Antonio Ferreyra, whom the Portuguese call their Horace, owing to his having successfully imitated that author's epistles, and whose works were reprinted in 1772 at Lisbon; Jeronymo Cortereal, the author of an epic poem entitled 'La Batalla de Lepanto,' and several other works in Spanish; Diego Bernaldez, who wrote eclogues, epistles, and numerous sonnets; and, lastly, Pedro de Andrade Caminha, whose long-lost works were discovered and printed at the expense of the Royal Academy of Lisbon in 1791, 8vo. The most celebrated however of all the Portuguese poets is Luys de Camoens, whose poem 'Os Lusiadas' is sufficiently known, and has been translated into almost every language of Europe. There are no less than three English versions of it: the most antient is that of Richard Fanshaw (Lond., 1655, fol.); next comes that of William Julius Mickle, which appeared at Oxford in 1776, 4to.; and lastly that of Thomas Moore Musgrave, 1826, 8vo.

Soon after the death of Camoens, who ended his life in an hospital in the year 1579, the learned Rodriguez Lobo Surupita published the first collection of his hitherto scattered poems. Manoel de Faria e Sousa afterwards published a learned Spanish commentary on the works of the Portuguese poet, Lisbon, 1685-9, fol. A very handsome edition was lately produced by Jozé Maria de Souza Botelho, and printed at Paris by Firmin Didot, 1817, 4to. Jorge Ferreira de Vasconcelos distinguished himself by the composition of several comedies. He was also the author of a new 'Romance of the Round Table.' Estevam Rodriguez de Castro, a poet, and at the same time a learned physician, wrote sonnets, odes, and eclogues with great success. Fernando Rodriguez Lobo de Surupita, who edited the miscellaneous poems of Camoens (Lisbon, 1595), likewise belongs to this age. Besides his juridical works, he was the author of various humorous pieces in verse. About this time antient literature seems to have had a powerful influence on the education of the Portuguese nobility. The learned statesman Miguel Cabedo de Vasconcelos, who resided for several years in France, was particularly distinguished as a writer of Latin verse; and the celebrated Rodriguez Lobo, who must not be confounded with Lobo Surupita, the editor of Camoens' works, made several successful attempts to introduce a kind of Ciceronian style into Portuguese prose. His 'Corte na Aldea, e Noites de Inverno' is a species of romance in prose, in which he not only imitated the style of the Roman orator, but introduced dialogues with the same forms of friendly intercourse as those which characterise the Tusculan and Academic Discourses, in which friends discourse concerning the proper education of an accomplished man of the world. This production, which must be considered as the first Portuguese classical prose work, did not prevent the author from cultivating poetry, and his pastoral romances are the most luxuriant blossoms of this old branch of Portuguese literature.

In this century also, the voyages of discovery of the Portuguese, and the travels of their missionaries, furnished abundant literary materials. Of this kind are the 'Perigrinaçam' (Travels), by Fernam Mendes Pinto (Lisboa, 1620, fol.), which were translated into almost every European language; the 'Itinerary through Persia and India' by Teixeira; the 'History of Tangiers' by Menezes; and the accounts of the missions to Abyssinia and Ethiopia, by Almeida, Alvares, and others. Romances and books of chivalry are another branch of literature which the Portuguese diligently cultivated during the sixteenth century. The former they imitated from the Spaniards, to whose language—the Castilian—this kind of composition seems to be essentially attached; but they claim, not without reason, the priority in the second. 'Palmerin de Oliva,' which, next to 'Amadis of Gaul,' Cervantes spares in his judgment on romances of chivalry, was written by Francisco de Moraes; and there is every reason to believe that 'Amadis,' in its original form, is also the production of a Portuguese writer; of the same sort are, 'As Ribeiras de Mondego,' by Saa Sotomayor, 'A Constante Florinda,' by Gaspar Pires de Rebello, the author of some short didactic novels, and many others which are mentioned by Barbosa Machado and *other* bibliographers.

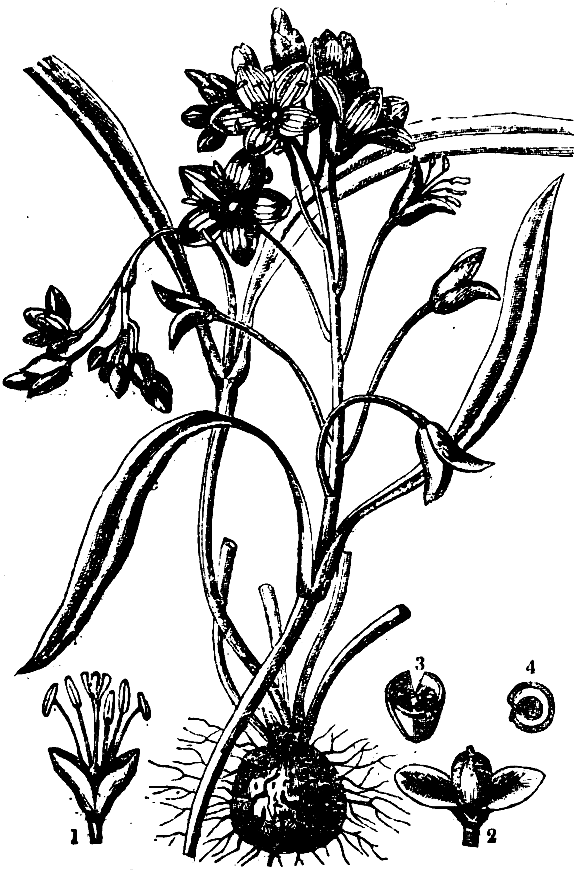
At no period did historical composition in Portugal attain the elevation which it reached in Spain; the antient chronicles are fewer, and not so well written; there is little or no local history, and as to a general narrative embracing all the events and political transactions of that kingdom, the Portuguese possess none but the incomplete work of Brito. As might be expected, the events of India formed the favourite theme of many of the Portuguese historians of the sixteenth century. At the head of these stands João de Barros, whom the Portuguese have called their Livy, and whose historical labours well deserve an ample notice in a review of Portuguese literature. He was born at the beginning of the sixteenth century, and died in the year 1570, at the age of seventy-four. Having been appointed by King John III. to the post of treasurer to the Indian department, he devoted his whole life to collect materials for his great historical work, which he divided into Decades, and published under the following title, 'Asia de João de Barros, dos feitos que os Portuguezes fizeram no descobrimento e conquista dos mares e terras de Oriente,' Lisboa, 1553. Barros left only three decades, but Diogo do Couto, who succeeded him in his office, wrote the seven remaining, five of which were printed at Lisbon, and two, still inedited, are preserved in manuscript in the library of the British Museum. [BARROS.] Nearly contemporily with Barros lived Lopez de Castanheda, the author of another history of the discovery and conquest of India by the Portuguese, the first edition of which appeared at Coimbra in 1552-61. This work was reprinted at Lisbon in 1797, with the old orthography. A diffuse Chronicle of King Emmanuel, published about the same time by Damião de Goes, is more valuable for the facts which it contains than for the style. The Life of the great Affonso d'Albuquerque, composed by his son, is highly esteemed by the Portuguese. The language is pure, but the style, which is that of the old chronicles, is monotonous and very diffuse. Bernardo de Brito, a monk who flourished towards the latter end of the sixteenth century, attained a higher degree of historical excellence. He was educated at Rome, where he seems to have early conceived the idea of writing a complete history of his native country. On his return to Portugal he entered the convent of Alcobaça, and began his arduous task, but he died in 1617, in the forty-seventh year of his age, without having accomplished the object to which he honourably aspired. The two volumes of his work entitled 'Monarchia Lusitana,' which contain only the antient history of Portugal, were printed, the first at the convent of Alcobaça, in 1597, the second at Lisbon, in 1609. Brito was likewise the author of a smaller historical work entitled 'Elogios dos Reys de Portugal.' Much that is really valuable for the early history of Portugal may be gathered from the collection entitled 'España sagrada,' Mad., 1754-1801, by Father Enrique Florez, who published the 'Cronicon Lusitanum' and 'Chronicon Conimbricense.' The other historians of Portugal who ought to be consulted are, La Clède, 'Histoire Générale de Portugal,' Paris, 1735, 2 vols. 4to.; Brandão, 'Monarchia Lusitana,' Lisboa, 1675-72; Lemos, 'Historia geral de Portugal e suas conquistas,' Lisboa, 1786-1804, 20 vols. 8vo.; Vasconcelos, 'Anacephalæosis Actorum Regum Lusitaniæ,' Antwerp, 1621; and lately, the 'History of Spain and Portugal,' in Dr. Lardner's 'Cabinet Cyclopædia.'

The origin of the Portuguese theatre is hid in darkness The Portuguese Gil Vicente was a contemporary of the Spanish Torres Naharro, and the dramatic compositions of the Portuguese poet so far approximate to the ruder comedies of the Spaniard, as to entitle the Portuguese to claim for their own country the honour of the invention. Gil Vicente was really the father of the Portuguese theatre, and his plays, though no longer acted, are still read by people of taste. The edition of his works which his son published soon after his death, contains, in addition to sixteen *autos*, or spiritual dramas, three tragi-comedies, some *farsas*, and a few dramatised novels, which are called *comedias*. In all these productions Gil Vicente exhibits much dramatic invention and a true poetic genius. It is said of Erasmus that he learned Portuguese for the express purpose of reading Gil Vicente's plays in the original, but though Gil Vicente is undoubtedly the father of the Portuguese drama, its history cannot be said to commence until the time of Saa de Miranda, the first dramatic author who composed dramas similar to the Spanish. His two chief productions however, 'Os Estrangeiros' (the foreigners), and 'Os Vilhalpandos' (so called from two Spanish soldiers who had both adopted the name of Vilhalpando), are dramas in the style of Plautus and Terence, of whom he avowed himself an imitator. Ferreira, who lived after Saa de Miranda, not only followed in his steps, but laboured, though ineffectually, to introduce into the dramatic poetry of Portugal a classical style. His tragedy of 'Inés de Castro,' though deficient in true pathos, contains many beautiful passages. His two comedies, 'Bristo' ('Comedia do Bristo') and the 'Jealous Man' ('Comedia do Cioso'), resemble in spirit and form those of Saa de Miranda. Three dramas by Camoens, 'El Rey Seleuco,' 'Os Amphytryoes,' and 'Filodemo,' are more remarkable for beauty of style than for invention. Dramatic invention and composition long wavered amidst heterogeneous forms, until the Portuguese poets, who wished to write for the theatre, had no alternative but to become the imitators of Lope and the dramatic authors of his age, and to renounce entirely the formation of a nationaldrama. This in fact took place. During the seventeenth and eighteenth centuries the Portuguese stage was inundated with translations of Spanish dramas, and all hopes were lost of re-establishing the national drama.

With the sixteenth century the brilliant period of Portuguese literature passed away, and the connection with Spain and the influence produced at the beginning of the seventeenth century by the fantastic school of the Gongoristas [GONGORA] almost entirely naturalised Spanish literature in Portugal. Thus the names of Manoel Faria e Sousa, who died in 1649, and was the author of many works in verse and prose; of Jacinto Cordeiro, a dramatic writer of some eminence; of Barbosa Bacellar, the author of several poetical works printed at Lisbon in 1716; of Manoel Severim de Faria, who wrote some political essays, and many more eminent authors, belong to the history of Spanish rather than to that of Portuguese literature. The restoration of the independence of Portugal, though it called forth fresh displays of patriotism, had no influence on the literature of the country, which continued during the rest of the seventeenth and the greater part of the eighteenth century to follow the traces of the Spanish. Though the Academia Real das Sciencias of Lisbon, founded by king Jozé Emmanuel in 1714, did much towards rousing the nation from its lethargy, and directing attention to the cultivation of science, it was not till the time of Pombal, who himself was a great friend to scientific pursuits, that Portuguese literature revived and acquired a national tone. Francisco Xavier de Menezes, Conde da Ericeyra, the first president of the Academia Portugueza, translated Boileau's 'Art Poetique' into Portuguese octaves, and published, among other writings, an epic poem entitled 'La Henriqueida,' on the foundation of the Portuguese monarchy by Henry of Burgundy, in which he endeavoured as far as possible to fulfil all the conditions of poetic art according to the principles of the French critics. This poem was printed for the first time at Lisbon in 1741, 4to. Contemporaneously with Ericeyra lived Antonio de Lima Barros Pereira, who in 1720, published several religious and other pieces under the title of 'Floresta Appollinea.' Another poet, named Alexandro Antonio de Lima, published in 1740 his 'Rasgos Metricos,' being a collection of poems on various subjects, chiefly written in the Spanish language. Manoel da Costa, a Brazilian, whose complete works were published at Coimbra in 1768, 8vo., was celebrated for his eclogues and *epicedios* or elegies. He was likewise the author of several songs. About the middle of the same century an author, generally called O Judeo, because he was a Jew, displayed great talent in the composition of Portuguese operas. His 'Don Quixote,' which was represented in 1733, and his 'Esopaida, or the Life of Æsop,' may be put on a level with the best operas of Metastasio. Another poet, named Garção, whose poetical works appeared at Lisbon in 1778, 8vo., contributed to the diffusion of good taste. About the same time the desire to cultivate a correct style in Portuguese poetry was fostered by new translations of some of the Latin classics. The 'Odes' of Horace were elegantly translated into Portuguese verse by Joaquim Jozé da Costa e Sá (Lisboa, 1781); the 'Satires' of Sulpitia, by Antonio Luis de Azevedo (Lisboa, 1786); Ovid's 'Heroides,' by Miguel de Couto Guerreiro (Lisboa, 1789); and the 'Comedies' of Terence, by Leonel da Costa (Lisboa, 1788). Paulino Cabral de Vasconcellos must also be named among the Portuguese poets who at the close of the eighteenth century corrected the national taste and subjected it to classical rules. The collection of his poems printed at Oporto, in 1786, in 8vo, contains two hundred and forty-five sonnets, which are greatly admired. Doña Catharina de Sousa wrote a tragedy called 'Osmia,' which was crowned by the Academy. The subject is chosen from the antient history of Portugal, and although when acted upon the Lisbon stage it did not meet with a favourable reception, Portuguese critics look upon 'Osmia' as the best tragedy in their language. The names of Francisco Diaz Gomez, Francisco Cardoso, Alvarez de Nobrega, Xavier de Matos, Valladares, and Nicolao Tolentino, occupy a prominent place among the modern poets of Portugal. Francisco Manoel, who was born in 1734, and was long confined in the dungeons of the Inquisition, published, in 1808, at Paris, a volume of lyric poems. José Basilio de Gama wrote a poem on the conquest of Paraguay, which is very much esteemed. Manoel Maria de Barboza du Bocage is also counted among the popular poets of Portugal. Of his 'Rimas,' the second edition appeared at Lisbon in 1800; and the third, in 1804, under the title of 'Poesias,' dedicated to the Countess of Oyenhaussen. This lady, a daughter of the Marquis of Alorno, is said to have made a Portuguese translation of Wieland's 'Oberon.' Araujo de Azevedo, a distinguished statesman, is the author of several excellent translations such as Dryden's 'Alexander's Feast,' some of Gray's 'Odes,' and the 'Elegy in a Country Church-yard.' Jozé Monteiro de Rocha and Mozinho d'Alboquerque are also esteemed good poets. Prose-writing however was far from keeping pace with these poetical effusions. With the exception of Barbosa Machado's 'Biographical Dictionary of Portuguese Authors,' written in imitation of Nicolas Antonio's 'Bibliotheca Nova et Vetus,' which is a valuable work, scarcely an historical or literary composition appeared in Portugal in the eighteenth century. A few years since, Padre Antonio Moura published a Portuguese translation of a history of Africa entitled 'Al Kartas,' written about the middle of the fourteenth century by a Moor of Granada. The same writer is now publishing a translation of the original travels of Ibn Battutta, an Arabian writer of the fourteenth century, the first volume of which has just appeared at Lisbon in 4to. Since 1827, a Portuguese periodical has been published in Paris, called 'Novos Annaes das Sciencias e das Artes,' in which a fragment of a great Portuguese poem yet in manuscript, 'Branca ó la Conquista de Algarve,' has been printed. A monthly Review has likewise been lately started at Oporto. Scientific studies, especially mathematics and natural history, if not entirely uncultivated, attract little attention. According to Balbi, among the three millions of Portuguese there are hardly five hundred readers of scientific books. The only comprehensive history of Portuguese literature in any European language is that of Frederick Bouterwek; this work, which comprises also the history of Spanish literature, was translated into English by Miss Ross (Lond., 1823, 8vo.). But Bouterwek's work, in the opinion of critics, is far from being either complete or accurate. Sismondi, in his 'Littérature du Midi del' Europe' (vol. iv.), has done little else than copy the German author. A short history of the Portuguese language and literature may also be found in the preface of Joaquim de Santa Rosa Viterbo to his 'Elucidação das Palabras, Termos, e Frases que em Portugal antiguamente se usarão,' &c., Lisboa, 1798, 2 vols. 8vo.

Those who wish to get an insight into Portuguese literature may consult Barbosa Machado, *Bibliotheca Lusitana*, Lisboa, 1741-59, 4 vols. fol.; Faria e Sousa, *Europa Portugueza*, Lisboa, 1678-80, 3 vols. fol.; Velasquez, *Origines de la Poesia Castellana*, Malaga, 1754, 4to., and Dieze's Remarks upon that work; Sarmiento, *Obras Posthumas*, Madrid, 1775, 4to.; but above all, the *Memorias de Litteratura*, published by the Royal Academy of Sciences in Lisbon, 1792-1836, 4to., and the *Catologo dos Livros, que se hão de ler para a Continuação do Diccionario da Lingua Portugueza*, a work which appeared in 1792 by order of the same Academy.

PORTULA'CEÆ, a small natural order of polypetalous Exogens with hypogynous stamens; distinctly characterised by having two sepals, five petals, and a central placenta, whose seeds contain a curved embryo, lying upon mealy albumen. Their fruit is commonly one-celled, but the edges of the carpels are sometimes so much inflected as to press upon the placenta and divide the interior into cells. They are annual, perennial, half-shrubby or shrubby plants, with entire more or less succulent leaves, rarely furnished with stipules, and with flowers which are often very showy, although more frequently inconspicuous. Their prevailing colour is purple or scarlet. They occur in all the hotter or milder parts of the world, especially in dry exposed situations, for which their succulent leaves render them well-suited; the Cape of Good Hope is their favourite station.



Portulaceæ. A plant of Claytonia virginica.

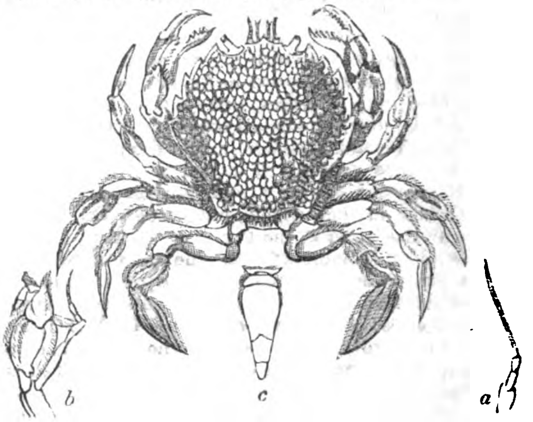
1, Calyx, stamens, and pistil; 2, capsule, with the two permanent sepals; 3, a transverse section of a capsule; 4, a vertical section of a seed.

Common Purslane, *Portulaca oleracea*, a potherb, now disused, indicates the harmless quality of such plants. The Tulinums and Calandrinias and a few species of Portulaca are well known as gay garden-flowers.

PORTUMNUS, Dr. Leach's name for a genus of *Brachyurous Crustaceans*.

Generic Character.—External antennæ setaceous, very short, having their two first joints larger than the others, inserted at the internal canthus of the eyes. *External jaw-feet* having the third joint of their internal branch elongated, nearly conical and notched internally. First pair of *feet* large, equal, with the fingers of their pincers rather long. Fifth pair of feet terminated by a flattened foliaceous and nearly lanceolate joint. Carapace rather flat above, with the anterior border arched and semicircular, and the posterior border nearly truncated, having its longitudinal diameter equal to the transversal diameter; *orbits* without fissures, *eyes* moderate.

Example, *Portumnus variegatus*. *Locality.*—The Adriatic Sea, the Mediterranean, and the ocean.



Portumnus variegatus, male.

a, external antenna; *b*, external jaw-foot; *c*, tail or abdomen.

The species above figured appears to be identical with *Platyonychus latipes* of Milne Edwards; nor does there appear to be any sufficient reason for distinguishing the form generically from *Platyonychus*. [PORTUNIDÆ.]

PORTU'NIDÆ, or *Paddling Crabs*, a family of *Brachyurous Crustaceans*, nearly allied to the *Cancerians*.

M. Milne Edwards makes the *Portunians* the second tribe of the family of *Cyclometopes*, observing that it nearly corresponds to the genus *Portunus*, as it was established by Fabricius, and comprehends the greater part of the crustaceans which Latreille arranged in his division of *Brachyures nageurs* (*Swimming Brachyura*). M. Milne Edwards is of opinion that the closest analogy unites these animals to the Cancerians, from which they are hardly to be distinguished except by the peculiar conformation of their posterior feet; a character of much importance, inasmuch as it influences their manner of life, but which is found in a manner more or less marked in the species belonging to the greater part of the other natural groups of the section *Brachyura*.

The general form of the *Portunians*, says M. Milne Edwards in continuation, does not ordinarily differ much from that of the greater part of the *Cancerians*, but the *carapace* is always but little elevated, and sometimes has a lozenge-shape. The orbits are directed upwards and forwards. The *internal antennæ* are bent back transversely, or at least very obliquely outwards, and the basilary joint of the *external antennæ* is partially lodged in a gap of the internal orbitary angle. The third joint of the *external jaw-feet* is always wider than it is long, and sharply truncated or notched at its anterior and external angle for the insertion of the fourth joint.

Orbits, antennæ, jaw-foot, &c., of Portunus.

The *sternal* plastron is always very wide, and in general the last thoracic segment is much more developed than all the others, even than that which carries the anterior feet; the suture which separates this segment from the preceding is directed very obliquely forwards and inwards; the vault of the sides is generally nearly horizontal, and the posterior *sella Turcica* very narrow. The anterior *feet* are in general very elongated, the succeeding feet are sometimes natatory, and the posterior feet always so, their tarsus being lamellar: the second pair of feet are ordinarily more than once and a half as long as the carapace.

Habits of the Tribe.—The crustaceans of this group are for the most part essentially swimmers, and live often out at sea. They are vulgarly called *Puddlers.* The following genera are arranged under the tribe by M. Milne Edwards.

Carcinus. (Leach.)

Generic Character.—Carapace approaching in general form that of *Panopeus*, but little convex, although sufficiently elevated, and remarkably wider than it is long. The latero-anterior borders, which are deeply dentated, form with the orbital border a regular curvature which does not reach beyond the level of the middle of the genital region; latero-posterior borders very long and moderately oblique. The branchial regions very much developed and rounded anteriorly. Front advanced, horizontal, of moderate width. Orbits oval and directed forwards; there is a fissure at their upper border and one at their lower border; the gap at their internal angle lodges the base of the external antenna, the first joint of which is narrow and cylindrical, and reaches to the front; their moveable stem is very long and inserted in the orbital gap. The internal antennæ are bent back in their nearly circular fossets obliquely outwards. The buccal frame is a little wider backwards than it is in front, and the third joint of the jaw-feet is much dilated externally, and notched at its two internal angles. The *sternal plastron* is similar to that of the *Portuni*, and so would be the feet, if it were not that the tarsus of the posterior feet is not much enlarged, and is of a flattened lanceolate form, though narrow, whilst that of the preceding feet is styliform. The abdomen of the male is only composed of five segments. (M. E.)

Example, *Carcinus Mænas*, *Cancer Mænas* of authors, *Crâbe enragé* of the inhabitants of the coast of Normandy, *The small common Crab* hawked about London and eaten by the poorer classes. Length rather more than two inches.

Feet of Carcinus.

Locality, Habits, &c.—Very common on the coasts of England and France, where it is found at low tide between stones and buried in the sand. This species runs on the beach with rapidity, and can sustain a long absence from the water. It is edible, though not much used as an article of food in England; but, during the summer, a great many are brought to Paris. Colour, dirty green; red when boiled.

Platyonychus. (Latr).

Generic Character.—Carapace narrower and more regularly convex than that of the other Portunians, often much longer than it is wide, and sometimes circular. Front very narrow and dentated. Latero-anterior borders a little curved and directed backwards, and, like those of the *Carcini*, the *Polybii*, and the greater portion of the *Portuni*, divided into five teeth. Orbits not deep, and directed forwards. Internal antennæ bent back obliquely forwards, with their fossets very imperfectly separated from the orbits. Disposition of the external antennæ different from that in the *Carcini*, the *Portuni*, the *Thalamitæ*, and the *Lupeæ;* their first joint, which is very small, is not soldered to the front, but is moveable, like the succeeding ones, and is inserted between the lower orbital border and the antennary fosset. The external jaw-feet present nothing remarkable, except in their third joint, which is narrower than in the greater part of the *Portuni*, and advances obliquely to the nucleus of the antennary fossets. Sternal plastron oval, narrow, and very much narrowed posteriorly, and, as in the *Portuni*, its median suture occupies only the two last segments. The anterior feet are moderate and not very unequal; they are applied exactly against the buccal region, and entirely resemble those of the *Portuni;* the second pair of feet are rather long, and have the tarsus flattened, a little enlarged, and of nearly a lanceolate form; the tarsus of the succeeding feet is also a little flattened, but rather styliform than lamellar; the fifth pair completely natatory. (M. E.)

M. Milne Edwards divides the genus into the following sections and subsections:—

α.

Species having the frontal teeth unequal in number, one of them occupying the median line, and a single fissure at the superior orbital border.

a. Tarsi of the posterior feet of lanceolate form.

Example, *Platyonychus latipes* (*Cancer latipes*, Penn.; *Portumnus variegatus*, Leach (*Malac.*); *Platyonychus depurator*, Latr.). Length about an inch. *Locality*—Coasts of England and France. [Portumnus.]

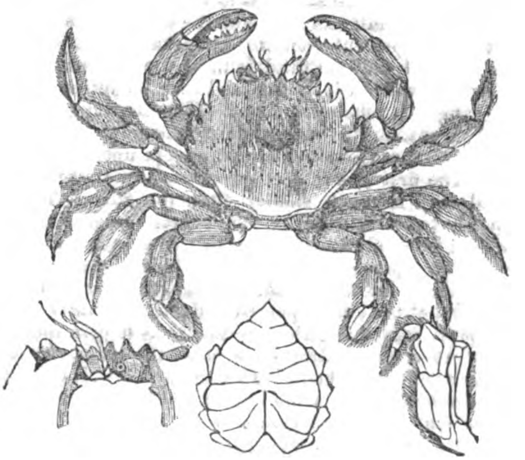
a a. Tarsi of the posterior feet oval and obtuse at the end.

Example, *Platyonychus ocellatus* (*Cancer ocellatus*, Herbst; *Portunus pictus*, Say; *Platyonychus oscellatus*, Latr.). Length about two inches.

β.

Species having the frontal teeth equal, and consequently not one on the median line, and two fissures at the superior orbital border.

Example, *Platyonychus bipustulatus.* Length from two to five inches. *Locality*—Indian Ocean.



Platyonychus bipustulatus.

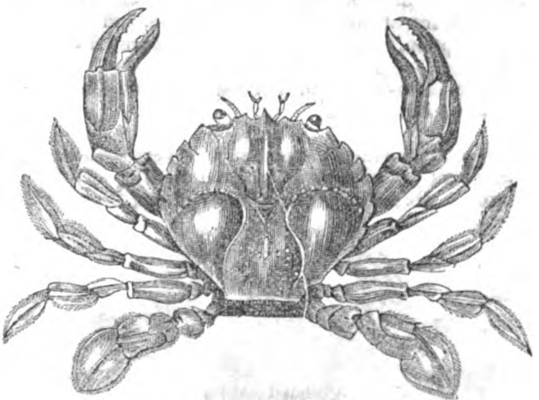
γ.

Species having the front advanced in form of a triangular muzzle and simply undulated on its borders.

Example, *Platyonychus nasutus* (*Portunus biguttatus*, Risso, *Crust. Nice.*) very small. *Locality*—The coasts of the Mediterranean.

Polybius. (Leach.)

Generic Character.—Very nearly allied to *Platyonychus*, from which it hardly differs, except in the form of the feet, which are all natatory; those of the second, third, and fourth pairs are very much flattened, and terminated by a very large and lanceolate joint, which has the same form throughout. The posterior feet have the same form as those of *Platyonychus bipustulatus*, excepting that their third joint is extremely short and nearly globular. The sternal plastron is wider, especially posteriorly, than in *Platyonychus*, but presents the same disposition as to the median suture. The abdomen of the male has the ordinary number (five) of joints. (M. E.)



Polybius Henslowii.

Example, *Polybius Henslowii.* Length about two inches: colour brown. *Locality*—The British Channel, where it appears to haunt at a distance from the coast.

Portunus. (Fabr.)

Generic Character, as restricted by M. Milne Edwards.—Carapace nearly of the same form as in *Carcinus*, wider than it is long, but with its longitudinal diameter at least equal to two-thirds of its transversal diameter, and the contour of its anterior portion ordinarily more curved than it is in that genus. The fronto-orbital border occupies hardly more than the half of the transversal diameter of the carapace, and the front, which is narrow, advances always much beyond the insertion of the external antennæ, and reaches in a remarkable manner beyond the level of the inferior border of the orbit, and the external angle of this cavity. The latero-anterior border of the carapace is delicate and armed with four or five large teeth; the orbits are oval. The antennary fossets are placed on the same level with the eyes, are transversal, and are separated from each other by a partition, the border of which is never prolonged into the form of a spine. The basilary joint of the external antennæ is but little developed, but completely separates the antennary fosset from the orbit, and is soldered to the front; the moveable stem which succeeds to this joint would seem to spring from the internal angle of the orbit. The structure of the mouth presents nothing remarkable, but it is to be borne in mind that the third joint of the external jaw-feet is at least as wide as it is long, and that its anterior and internal angle is much truncated. The sternal plastron is much longer than it is wide, and much narrowed backwards; its median suture is not extended, except upon the last two rings. The first pair of feet are of moderate size, and, in general, one is much stouter than the other. The arm reaches but very little beyond the lateral border of the carapace, and is not always armed with spines as in *Lupea;* the carpus always presents on its internal side a great spiniform prolongation, and the hand, the length of which never equals that of the antero-posterior diameter of the carapace, is ordinarily moved a little inwards, so as to give the capability of an exact application against the anterior and inferior portion of the body. The three succeeding pairs of feet are nearly of the same length; but, nevertheless, the third or fourth pair are generally longest, and the second are shorter than the anterior pair; their last joint is styliform and canaliculate. The fifth pair are, on the contrary, very much enlarged at the end; their third joint is nearly of the same form as the preceding ones, and their last joint is lamellar, and oval or lanceolate. The abdomen presents nothing remarkable, its disposition being nearly the same as in the preceding genera, except that it is less wide in the females and is always triangular in the males. The genus, as restricted, establishes the passage between the *Carcini* on one side and the *Lupeæ* on the other. (M. E.)

Habits, Locality, &c.—The *Portuni,* though essentially aquatic and swimming with much ease, are not met with far out at sea like the *Lupeæ.* Their haunts are near the shore, and at spring-tides they are often found during the ebb hidden under stones, in the small pools of water left by the sea. Some species inhabit still greater depths, on oyster-beds, &c., and they are never seen to run, like the *Carcini,* on the shore. When withdrawn from the water, they perish in a few hours. They are eminently carnivorous, feeding mostly on the dead bodies of animals which they find in the sea. Many of the species are eatable, and all, with a single exception, inhabit the coasts of England and France. (M. E.)

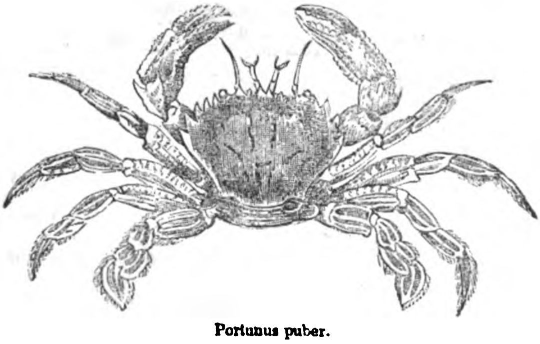
M. Milne Edwards divides the species into the following sections and subsections.

α.

Species having the front armed with very distinct teeth.

a. Front armed with at least ten teeth or spines.

Example, *Portunus puber* (*Cancer puber,* Linn.; *Cancer velutinus,* Penn.). Length about two inches and a half. *Locality*—The coasts of England and France. This is the *Crâbe à laine, Crâbe Espagnol,* &c., of the French.



Portunus puber.

aa. Front armed with three or five teeth.

*aa**. Carapace wrinkled, unequal, rather granulous, and covered with hair.

Example, *Portunus plicatus* (*Cancer Depurator,* var. Penn.; *Portunus Depurator,* Leach; *Portunus lividus* (var.?), Leach, *Malac.*). Length about eighteen lines. Colour reddish. *Locality*—Coasts of England and France.

*aa***. Carapace nearly united, and without hairs.

Example, *Portunus marmoreus* (*Cancer Depurator,* Penn.). *Locality*—Coasts of England and France. The last joint of the posterior feet in this species terminates in a point.

β.

Species having the front entire or divided only into rounded lobes.

b. Latero-anterior borders of the carapace armed with five teeth.

*b.** Front divided into three lobes, of which the median lobe is more advanced than the lateral lobes.

Example, *Portunus corrugatus* (*Cancer corrugatus,* Penn.; *Portunus puber,* Blainv.). Length about two inches. Colour reddish. *Locality*—Coasts of England and France; very common in the Mediterranean.

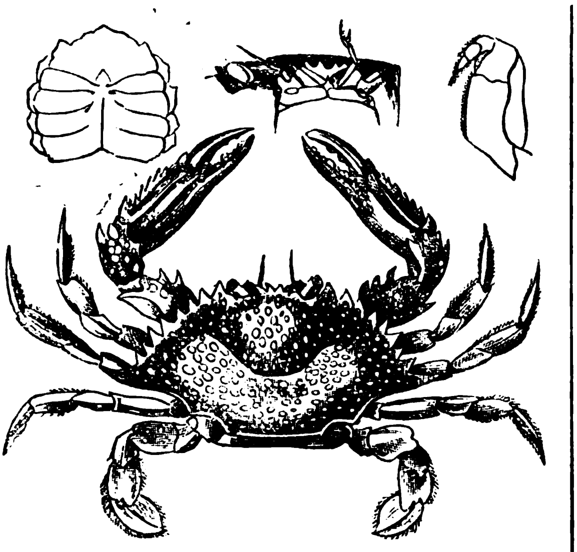
*b***. Front entire, or divided only into two symmetrical lobes.

bb. Latero-anterior borders of the carapace armed with four teeth only.

Example, *Portunus integrifrons* (*Cancer Navigator?* Herbst). Carapace pubescent. Length about two inches. *Locality.*—Indian Ocean.

Lupea. (Leach.)

Generic Character.—The greater part of the *Lupeæ* are remarkable for the flatness and great transversal extent of their *carapace,* the diameter of which in that direction is more than double its length. Front nearly always narrow, and much less projecting than the lower border or external angle of the orbit; the latero-anterior border of the carapace very long, forming generally, with the anterior border, a very regular and open segment of a circle, and each of them armed with nine teeth, more or less projecting and spiniform; of these spines the last is in general much greater than all the others, and is directed straight outwards, though sometimes it does not differ from that which precedes it. Orbits oval, and directed obliquely forwards and upwards; their lower wall does not reach to the front, and there is, at the internal canthus, a large notch, which the basilary joint of the external antenna fills; at the upper border of these cavities are two fissures. The fossets which lodge the internal antennæ are not deep, and hardly covered by the front; the vertical lamina which separates them is armed with a spiniform point, which is often prolonged beyond the anterior border of the carapace. Externally, these cavities are completely separated from the orbits, and the stem of the antennæ, which are there inserted, is sufficiently short to be bent back there entirely. The basilary joint of the external antennæ is soldered to the inferior border of the superior and external angle of the front; it is not wide, and gives insertion, by the extremity of its internal border, to the moveable stem formed by the succeeding joints, so that this stem, the length of which is considerable, would seem to spring from the internal canthus of the eye, and nothing prevents its being bent backward outwards to conceal itself in the orbital cavity. The epistome is extremely narrow, and the buccal frame is very nearly square, but, in general, wider forwards than it is behind. The third joint of the external jaw-feet is rather abruptly truncated forwards and inwards. The sternal plastron is nearly always tolerably convex longitudinally, very wide, and hardly closed (resserré) posteriorly; its median suture occupies the last three segments. The first pair of feet are very large, and always armed with a certain number of spines; the fingers are elongated, and not remarkably curved inwards. The three succeeding pairs of feet are much shorter, and are all nearly of the same size; sometimes their terminal joint is slender, rounded, styliform, and in general canaliculated; sometimes it is flattened, lamellar, and natatory. In the first case the feet would appear to be specially destined for walking, whilst in the second their disposition is more favourable to swimming. The fifth pair are very strong, and constitute, by the width of their last two joints, powerful oars; their third joint (or thigh) is in general stout, but very short, and pre-



Lupea and details.

sents scarcely any spines, as in *Thalamita*. The last joint is always oval. In the female the abdomen presents nothing remarkable, except that its length is very considerable; in the male its structure is the same as in the preceding genera, there being only five distinct pieces, the third, fourth, and fifth rings being soldered together; the first three segments are always very large, but at the level of the fourth there is a sudden narrowing, and the last three are narrower still. (M. E.)

Habits, &c. of the Genus.—The *Lupeæ* are Pelagic Crustaceans, living in the ocean, where they have been seen by many voyagers, and where they have no other apparent place of repose than the floating *fuci*. Their swimming powers are great, and Bosc remarked that they have the faculty of sustaining themselves at the surface of the water in a state of repose, without the execution of any visible movement.

This genus is divided by M. Milne Edwards, who gives the above summary of their habits, into the three following groups:—

AA. Species with the body very thick and convex above; first pair of feet stout, and not much elongated; the hand considerably shorter than the carapace.

Convex Lupeæ.

Example of this first subgenus, *Lupea Tranquebarica* (*Cancer olivaceus*, Herbst; *Cancer serratus ?* Forsk.; *Portunus serratus*, Rüpp.; *Portunus Tranquebaricus*, Fabr.).

This, the largest Portunian known, is six or eight inches in length, of a greyish green, and inhabits the seas of Asia.

A. Species having the body very much compressed; the first pair of feet stout, and but little elongated; the hand remarkably shorter than the carapace. Tarsi of the second, third, and fourth pairs flattened, lamellar, and nearly lanceolate.

Swimming Lupeæ. (Second subgenus.)

* Species having the last lateral spine at least twice as large as the preceding, and the front projecting but little.

a. Median teeth of the front projecting but little, and sometimes hardly visible.

a*. Upper border of the orbit armed with a spine.

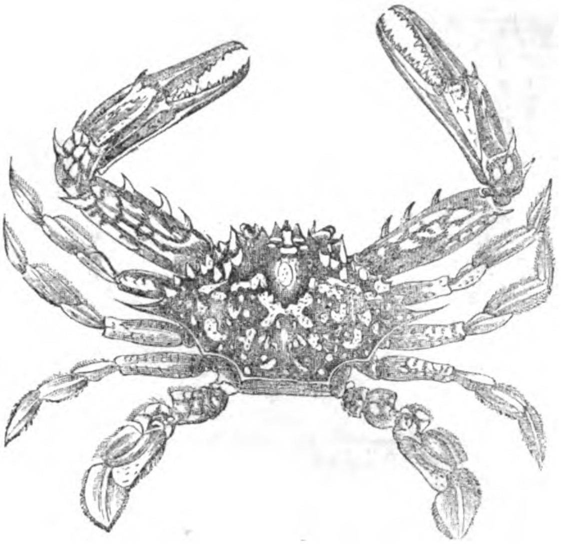
Example, *Lupea pelagica* (*Cancer pelagicus*, Linn.; *Cancer reticulatus*, and *Cancer Cedo Nulli*, Herbst; *Portunus pelagicus*, Fabr.). Length from three to four inches: colour greyish-green with yellow spots. *Locality*—The Red Sea and the whole Indian Ocean.

a**. Upper border of the orbit without any spiniform prolongation.

Example, *Lupea sanguinolenta* (*Cancer sanguinolentus*, Herbst; *Cancer pelagicus, var.* and *Portunus sanguinolentus*, Fabr.). Length about two inches. Carapace with three large bright red spots on the back-part of the carapace. *Locality*—The Indian Ocean.

a***. Median teeth of the front small, but projecting.

Example, *Lupea cribraria* (*Portunus cribrarius*, Lam.). Length three inches; colour yellow, with numerous whitish spots. *Locality*—Coasts of Brazil.



Lupea pelagica.

B. Species having the last spine of the latero-anterior border of the carapace scarcely longer than the others.

b. External border of the arm without spines.

Example, *Lupea spinimana* (*Portunus pelagicus* and *Portunus spinimanus*, Latr.). Length from three to four inches. *Locality*—Coasts of Brazil.

bb. External border of the arms spined.

Example, *Lupea lobifrons*. Length one inch. *Locality*, The East Indies.

C. Tarsi of the second, third, and fourth pair of feet narrow and styliform.

Walking Lupeæ. (Third subgenus.)

a. Species having the last tooth of the latero-anterior border of the carapace resembling the others.

a. Teeth of the latero-anterior borders alternately large and small.

Example, *Lupea rubra* (*Ciri apoa*, Marc.; *Portunus ruber*, Lam.). Length about two inches. General colour reddish; extremity of the claws black. *Locality*—The coasts of Brazil.

a*. Teeth of the latero-anterior borders of the carapace resembling each other.

Example, *Lupea granulata*. Length about an inch. *Locality*—The Isle of France.

b. Species with the last tooth of the latero-anterior border of the carapace at least twice as large as the preceding.

b. Median teeth of the front much more projecting than the lateral teeth.

Example, *Lupea Sebæ* (*Cancer marinus scutiformis*, Seba, *Mus.*, iii., pl. 20, f. 9, copied by Latreille, in *Encycl.*, pl. 272, f. 6, under the name of *Portunus sanguinolentus*. Size about the same as *L. granulata*. *Locality*—Coasts of Brazil. (M. E.)

bb. Median teeth of the front less projecting than the others.

*bb**. Hands large, of the ordinary form, and shorter than the transversal diameter of the carapace.

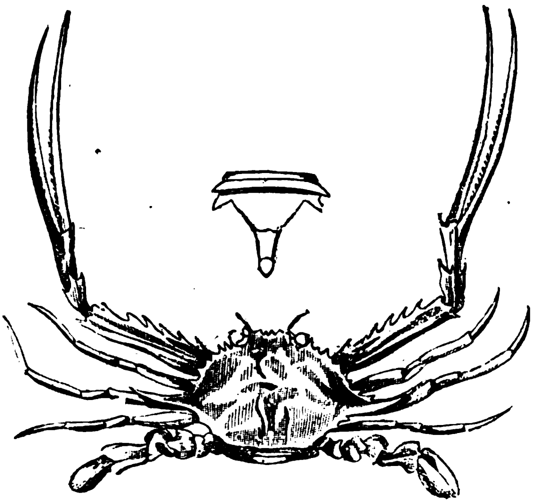
Example, *Lupea hastata* (*Cancer hastatus*, Linn.; *Portunus hastatus*, Latr.; *Lupa Dufourii*, Desm.). Length about two inches. *Locality*—The Mediterranean.

*bb***. Hands filiform and of great length, being nearly once and a half the transversal diameter of the carapace.

Example, *Lupea Forceps*, *Lupa Forceps*, Leach; *Portunus Forceps*, Latr.). Length about an inch. *Locality*—The Antilles.

Thalamita. (Latr.)

Generic Character.—Carapace in most of the species characteristic; but in some it gradually approximates that of the *Lupeæ;* in fact, sometimes it has the form of an elongated square; its transversal diameter is nearly double the length, and its fronto-orbital border forms with the latero-anterior borders a nearly right angle; in other cases it is nearly hexagonal, its six borders form nearly equal angles, and its width only exceeds about half of its length. The front is always very wide, projecting, and at least as much advanced as the inferior border and external angle of the



Lupea Forceps.

orbit, a disposition which is never observable in the *Lupeæ*. The latero-anterior borders of the carapace are more or less oblique, but always form with the fronto-orbital border a very strong marked angle, where there are from four to seven teeth, the last of which is never remarkably larger than the others. The eyes are stout and short; the orbits oval, and completely separated from the antennary fossets; the upper border of the latter presents two small fissures, and their angle is often nearly as distant from the median line as the angle which terminates behind the latero-anterior border. The internal antennæ bend back completely in their fossets; and the inter-antennary partition projects but little. The basilary joint of the external antennæ is in general very wide, and always soldered to the front throughout the whole extent of its anterior border, presenting externally a more or less considerable projection which separates the orbit from the point of articulation of the moveable stem of those appendages, and which is very long, and inserted sometimes very far from the orbital cavity. The epistome is very distinct and of a lozenge-shape. The buccal frame is very wide, and the external jaw-feet are disposed nearly as in the *Portuni*. The sternal plastron is very large and its median suture extends upon the last three rings. The anterior feet are very large, and cannot be concealed under the anterior portion of the body, as they are in the *Portuni* and *Platyonychi*; their third joint is spiny anteriorly and reaches much beyond the carapace; the hand is in general rough, with a considerable number of teeth, and is at least as long as the carapace. The three succeeding pairs are much shorter, and diminish in length successively; their tarsus is, in general, styliform. The fifth pair are, as ordinarily, the shortest of all, their third joint is nevertheless elongated, and at the extremity of its anterior border there is a rather strong spine, a disposition which never exists in the *Portuni* or the *Platyonychi*, and is extremely rare in the *Lupeæ*; towards their termination these feet become very wide, and their tarsus is oval. The abdomen presents nothing remarkable. (M. E.)

M. Milne Edwards divides the genus into the following sections:—

1.

Fronto-orbital border not occupying more than two-thirds of the width of the carapace, and forming a rather open angle with the latero-anterior borders, which are armed with six or seven teeth.

Hexagonal Thalamitæ.

2.

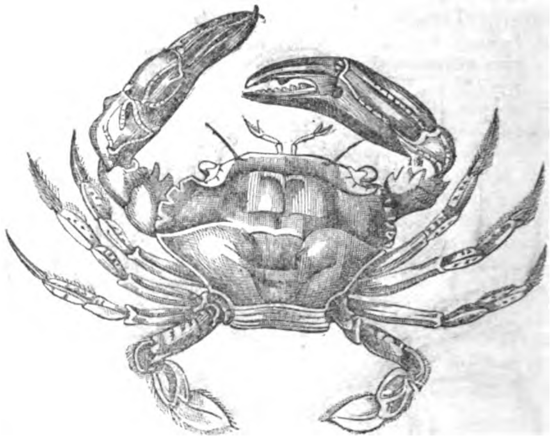
Fronto-orbital border occupying nearly the whole width of the carapace, and forming a nearly right angle with the latero-anterior borders, which are armed with four or five teeth.

Quadrilateral Thalamitæ.

The latter form the first subgenus in M. Milne Edwards's arrangement.

a. Species having the front entire or divided into lobes, but with no teeth.

Example, *Thalamita Chaptalii* (*Portunus Chaptalii*, Aud. *Crust. Sav. Egypte*). Length about an inch. *Locality*—The Red Sea.



Thalamita Chaptalii.

b. Species whose front is armed with deeply cut and flattened teeth.

Example, *Thalamita crenata*. (*Portunus crenatus*, Latr. *Thalamita Admete*, Guerin, *Icon. Cr.*, pl. 1, f. 4.)

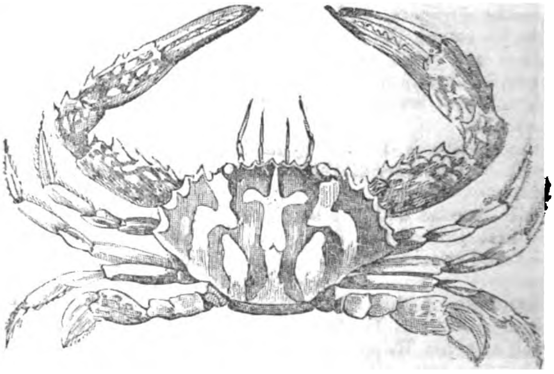
2nd Subgenus. (Hexagonal Thalamitæ.)

a. Species having the latero-anterior border of the carapace armed with six teeth.

a. Last lateral tooth nearly the same size as the preceding.

a*. Anterior feet armed with spines, but without elevated granulations.

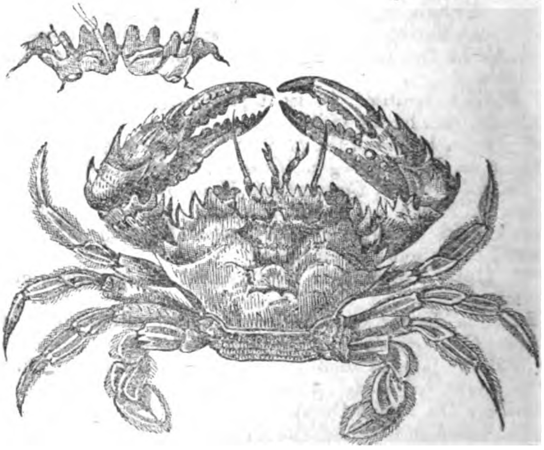
Example, *Thalamita crucifera* (*Portunus cruciferus*, Fabr. and Latr.; *Cancer sexdentatus*, Herbst?). Length from three to four inches; colour reddish with yellow spots and bands, the median markings resembling a cross. *Locality*—The Indian Ocean.



Thalamita Crucifera.

a**. Anterior feet presenting between the spines with which they are armed, a great number of tubercles or elevated granulations.

Example, *Thalamita Natator* (*Cancer Natator*, Herbst; *Portunus sanguinolentus*, Bosc.). *Locality*—Indian Ocean.



Thalamita Natator.

aa. Last lateral tooth stouter and much more projecting than the others.

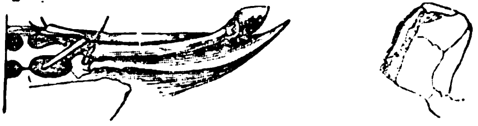
Example, *Thalamita Callianassa* (*Cancer Callianassa*, Herbst). Length about an inch. *Locality*—Indian Ocean.

b. Species having the latero-anterior border of the carapace armed with seven teeth, two of which are rudimentary.

Example, *Thalamita erythrodactyla* (*Portunus erythrodactylus*, Lam.). Length 2½ inches. *Locality*—Australasia.

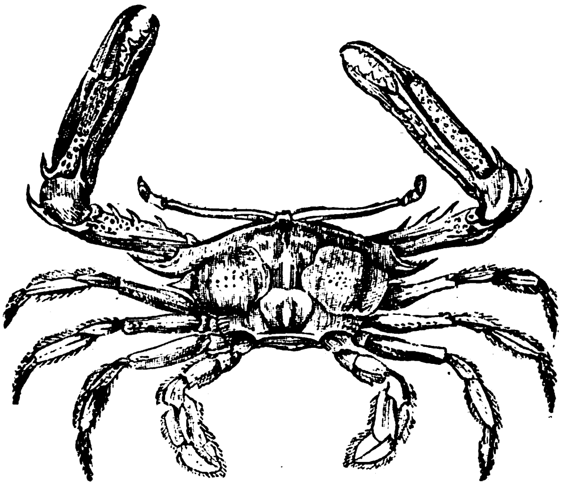
Podophthalmus. (Lam.)

M. Milne Edwards justly observes, that of all the Portunians the *Podophthalmi* have the most remarkable aspect, and characters the most easy to seize. The enormous length of their ocular peduncles, which are very short in the other *Swimming Brachyura*, is sufficient to distinguish them at first sight.



Eye, orbit, jaw-foot, &c. of Podophthalmus.

Generic Character.—Carapace of a very much elongated quadrilateral form, the two lateral sides of which are strongly truncated, and with its antero-posterior diameter not equalling the half of its transversal diameter. Its anterior border, which is nearly straight, is about four times as long as the posterior border. The front, or space comprised between the two eyes, is linear, and on each side the anterior border of the carapace is hollowed throughout its length into a very long and deep gutter, which constitutes the orbits; the external angle of these ocular cavities separates the anterior border of the carapace from its lateral border, the direction of which, very oblique, is the same throughout its length. The eyes are carried on delicate peduncles of extreme length; and these osseous stems are inserted near the median line of the front, and carry at their extremity the second ocular piece, whilst in the *Ocypodians*, where the eyes are also very much developed, it is on the development of this second piece, and not the first, that the length depends. The ocular bulb is not very large, and reaches the lateral extremity of the carapace. The internal antennæ are situated below the origin of the eyes, a disposition which is met with in no other Portunian, and their stem cannot bend itself back into the cavity where they are lodged. The external antennæ are also below the eyes; they are placed between the antennary fossets and the orbits, at the external side of the first, and their basilary joint is soldered with the borders of these two cavities, so as to complete their walls and to separate them from each other; the moveable stem which terminates these antennæ is formed of two small peduncular joints and of a slender and rather short multiarticulate filament. The *buccal frame* is extremely wide, and is only separated from the antennary fossets by a very delicate border; its anterior border is about twice as long as its lateral borders, and these last are directed obliquely backwards and inwards. The external jaw-feet leave a considerable space between them, and their third joint is nearly as wide as it is long; but it is so truncated forwards and inwards, that its form has been compared to a hatchet, the extremity of whose trenchant edge gives insertion to the succeeding joints, which are very large. The first pair of feet are large, and terminate by a nearly straight hand; when they are bent they reach much beyond the borders of the carapace. The succeeding feet are much less than the anterior pair, and the third pair are longer than the others. The joint which terminates the second, third, and fourth pairs is styliform and a little flattened. The fifth pair are very wide and in the form of natatory oars. The abdomen presents nothing remarkable in the females; but in the males it is triangular, and composed of five moveable pieces only. (M. E.)



Podophthalmus vigil.

Example, *Podophthalmus vigil* (*Portunus vigil*, Fabr *Podophthalmus spinosus*, Lam.). The only species known. Length from two to four inches. *Locality*—Indian Ocean.

Fossil Portunians.

M. Milne Edwards remarks that the fossil crustacean figured by Davilla (*Catal.*, t. iii., pl. 3, f. 6), and designated by M. Desmarest under the name of *Portunus leucodon* (*Cr. Foss*, p. 86, pl. 6, f. 1, 3), bears some analogy to *Lupea Tranquebarica*. The *Podophthalmus Defrancii* of the work last quoted appears, M. Milne Edwards observes, to differ principally from *Podophthalmus vigil* by the absence of the sharp spines which terminate the lateral angles of the carapace in the latter; but as the internal cast only is known, he remarks that it is very possible that this negative character does not really exist.

PORTUS, FRANCIS, a celebrated philologer, born in 1511, in the island of Crete. He lost both his parents at an early age, and was sent by a friend to Padua, where for six years he studied classical literature and philosophy. After the death of his friend and benefactor he repaired to Venice, where his talents procured him the directorship of the school for young Greeks. But owing to his inconsiderate expressions on matters of religion, he soon lost his place. He now went to Modena, where in 1536 he was made professor of Greek literature, after having signed some articles of faith, to which at first he strongly objected. He held this office for six years, at the end of which he exchanged Modena for Ferrara, to undertake the education of the sons of the Dutchess Renée of France. In this capacity he also carried on her correspondence with Calvin, whose doctrines this lady had secretly adopted. During his stay at Ferrara, Portus was made a member of the Academy of the Filareti. After the death of her husband, the dutchess returned to France, and Portus, from fear of persecution for his religious opinions, went to Geneva, where he obtained the rights of a citizen and a professorship in the university (1562). Here he spent the remaining years of his life, partly in fulfilling the duties of his office, and partly in writing those works by which he established his reputation as a scholar and a critic. He died on the 5th of June, 1581.

Portus has written explanatory and critical commentaries on various antient authors, such as Aristotle ('Rhetoric'), Aphthonius, Hermogenes, Longinus, Pindar, on the 'Greek Anthology,' some works of Xenophon, on Thucydides, and others. He translated into Latin the treatise of Apollonius of Alexandria, 'De Syntaxi, seu Correctione Orationis,' the 'Psalms,' the hymns and letters of Synesius, and the odes of Gregorius Nazianzenus. His son Aemilius Portus published, in 1584, six dissertations and some other works of his father. It is said that there are still some MSS. of Francis Portus in the library of Este, containing commentaries on several orations of Demosthenes and on Sophocles, which have never been printed.

PORTUS, ÆMILIUS, the son of Francis Portus, was born, about 1550, at Ferrara. In his youth he was instructed by his father in the antient languages and literature. After the death of his father he left Geneva, and in that same year (1581) he was made professor of Greek at Lausanne, where he remained for ten years, devoting his leisure hours to preparing new editions of antient authors. In 1592 he was invited to the chair of Greek literature in the university of Heidelberg, of which he afterwards became one of the greatest ornaments. He died at Heidelberg in 1610, at the age of 60 years.

The numerous works of Aemilius Portus consist of commentaries, translations, and original works. Among the first we may mention his Commentary on Pindar (1598), his edition of Euripides, with notes of Canter, Brodaeus, Stibilinus, and some of his own, Geneva, 1602; Aristophanes, Geneva, 1607; Aristotle's Rhetoric (the translation was made by Aemilius, the Commentary by his father), Spire, 1598; Homer's Iliad, Xenophon, and Thucydides. He translated into Latin the work of Proclus, 'De Theologia Platonis,' published at Hamburg in 1618; the Lexicon of Suidas, Colonia Allobrogum, 1619; a reprint appeared at Geneva in 1630. He also translated Thucydides and the 'Roman Antiquites' of Dionysius of Halicarnassus. The following are the original works of Aemilius Portus: 'Oratio de variarum Linguarum usu, necessitate, præstantiâque,' Cassel, 1611, 4to.; 'Dictionarium Ionicum Graeco-Latinum, quod indicem in omnes Herodoti libros continet,' Frankfort, 1603, 8vo.; a reprint of it appeared at Oxford in 1809. 'Dictionarium Doricum Graeco-Latinum, quod Theocriti, Moschi, Bionis, et Simmiae variorum opusculorum interpretationem continet,' Frankfort, 1604; 'Pindaricum Lexicon, in quo non solum Dorismi Pindaro peculiares, sed etiam verba phrasesque non vulgares et in aliis lexicis omissæ declarantur,' Hanau, 1604; 'De prisca Græcorum Compotatione,' Heidelberg, 1604; 'De Nihili Antiquitate et multiplici Potestate,' Cassel, 1609.

PORUS (Πῶρος), the name given by Greek writers to several Indian kings. From its frequent occurrence, it appears to have been the name of a family or tribe, rather than the proper name of an individual. Some modern writers suppose it to be the same word as the Sanskrit *paura*, a 'citizen;' but Lassen (*Pentapotamia Indica*, p. 17, 18) with more probability connects it with *Paurava*, or descendants of *Puru*, which we know, from the ancient writings of the Hindus, to have been the name of several Indian dynasties.

Alexander, in his invasion of India, met with two different kings of this name, one of whom ruled over the country between the Hydaspes and Acesines, and the other over the country betweeen the Acesines and Hydraotes (Ravee). The former made a formidable resistance to Alexander, but was conquered. Alexander however treated him with respect, and restored to him his kingdom, with enlarged limits. [ALEXANDER, p. 300.] The other Porus did not wait the arrival of Alexander, but fled to the kingdom of the Prasii. His dominions were given to the Porus whom Alexander conquered. (Arrian, *Anab.*, v. 20, 21, 29.) Porus however did not long survive Alexander. He was treacherously killed by Eudamus, B.C. 317. (Diod. Sic., xix. 14.)

Strabo mentions (xv., p. 686) that an Indian king of the name of Porus sent an embassy to Augustus.

POSEIDON. [NEPTUNUS.]

POSEN, a province of the Prussian monarchy, was formerly a part of the kingdom of Poland. On the first partition of Poland in 1772, the part of Posen to the north of the Netze, and on the second partition in 1793, the remaining part fell to the share of Prussia: this, together with the part of the kingdom south of the Vistula, as far as Warsaw, acquired by Prussia on the third partition, received the name of South Prussia. In 1807 all South Prussia was taken from Prussia to form part of the duchy of Warsaw. In 1815 the congress of Vienna restored the original province of Posen to Prussia by the name of the grand-duchy of Posen. It lies between 51° 10′ and 53° 32′ N. lat., and between 15° 7′ and 18° 38′ E. long. It is bounded on the north by the province of Prussia, on the east by the kingdom of Poland, on the south by Silesia, and on the west by Brandenburg. The area is 12,250 square miles, divided into the two governments of Bromberg and Posen.

Face of the Country, Soil, Climate, &c.—This province is perfectly level, except the banks of the Wartha in the circle of Obernik, which are rather more elevated, and there is here and there a hill on the frontiers of Silesia. The soil is partly marsh, which is very fertile, and partly sandy, but even here the sand is so mixed with more solid elements, especially loam, that the soil may be considered as tolerably good. The most fertile parts are the country on both sides of the Wartha, and the Netzbruch, a low tract on the river Netze, about 90 miles in length, and not above 3 in breadth, which, having been completely secured by dikes by Frederick II., is now converted into fine corn-land and meadows, with farmhouses and villages, where, under the Polish government, there were only unprofitable bogs and thickets. The river Wartha, which traverses the province in its whole breadth, and the Netze, are navigable. The Netze is connected by the Bromberg canal with the Brahe, which has been made navigable, and falls into the Vistula, which only touches the frontier for a short distance above Thorn, but is of great advantage by opening a communication with the Baltic. Besides these there are several other rivers, so that the province is very well watered. The Bromberg canal, which is twenty miles long, was constructed under Frederick II., at the expense of 200,000 dollars. There are several lakes, the largest of which is the Gopplo lake. The air is pure and healthy.

Natural Productions.—The chief productions are corn of all kinds, pulse, culinary vegetables, flax, and some hemp; tobacco, hops, fruit, and timber; the common domestic animals, game, poultry (especially geese), fish, and bees. There are limestone, freestone, saltpetre, and bog-iron, of which no use is made. Agricultural operations are carried on in a very careless manner. The country suffered very severely by the late wars, and this, with the changes in the government, checked the agricultural improvements, which had been successfully commenced under the Prussian government. Since 1815 however a better state of things has been gradually established. 'The common people,' says Dieterici, 'live in a very simple and poor manner; but it is undeniable that, especially of late, a considerable improvement has taken place in their condition. Great public buildings, one of which is the citadel of Posen, the organization of the public schools, and the regulation of the relations of the landowners and the peasants, ameliorate the condition of the common people.'

Trade and Manufactures.—The exports consist chiefly of corn, especially wheat, a large quantity of wool, timber, cattle, tallow, hides, wax, honey, hogs' bristles, and feathers. Manufactures were first introduced by German settlers, who fled from Silesia in consequence of religious persecution, and founded several towns on the frontier, such as Rawitsch, Fraustadt, Bojanows, Lissa, Kosche, and Meseritz. These towns and several others manufacture cloths of such good quality, that the Jews often sell them for Silesian and Dutch. Formerly considerable quantities of these cloths went to Russia; but the rigorous prohibitory system adopted by Russia has nearly put a stop to all trade between the two states.

Population.—The population amounted, in 1837, to 1,169,706 inhabitants, of whom the great majority are Roman Catholics, 250,000 Protestants, and 70,000 Jews. The Roman Catholics are under the archbishop of Gnesen and Posen. Though much has been done of late years, education is still very backward in this province. The great mass of the population are Poles, and Polish is the general language; there are however many strangers, especially Germans, who inhabit almost all the towns on the frontiers of Silesia and Brandenburg, and whose numbers were stated, twenty years ago, by Hassel, at 140,000.

The principal towns besides the capitals [BROMBERG; POSEN] of the two governments are:—1. In the government of Bromberg, Gnesen, an old ill-built town, with 6000 inhabitants, of whom 1800 are Jews; it is the see of a Roman Catholic archbishop, formerly the primate of Poland. Besides the cathedral, there are seven other Roman Catholic churches, two monks' convents, one nuns' convent, and a seminary for Roman Catholic clergy. The inhabitants manufacture some woollen cloth and linen, and there are breweries and distilleries. Inowratzlaff, an ill-built town, on a fertile plain, has 5100 inhabitants, of whom 2000 are Jews, who have considerable distilleries of brandy, breweries, and saltpetre works. There are five Roman Catholic churches, a Franciscan convent, and a synagogue. Schönlanke, a well-built town, with 4000 inhabitants, who have a considerable manufacture of woollen cloths. 2. In the government of Posen, Lissa, or Polish Lissa, has 8667 inhabitants, of whom 3470 are Jews. This is one of the chief manufacturing towns of this country, and belongs to Prince Sukowsky: it has a palace, a handsome market-place, a gymnasium, four Roman Catholic churches and one Lutheran church, a large synagogue, and extensive manufactories of woollen cloth, linen, snuff, succory (as a substitute for coffee), and carriages. The trade is very flourishing. Rawitsch, situated in a marshy spot near the frontiers of Silesia, has 8316 inhabitants (1786 Jews), who are mostly Germans. It is pretty well and regularly built, has a gymnasium, a fine Lutheran church, a handsome town-hall, and manufactures of woollen cloth, linen, leather, tobacco, and earthenware. Meseritz, situated in a beautiful and fertile country on the river Obra, has 4500 inhabitants, chiefly Germans, of whom 1150 are Jews. The manufacture of woollen cloth is very considerable. Krotoschin has 6337 inhabitants, of whom 2213 are Jews. They have manufactures of woollen cloths, linen, tobacco, and succory. There are also tanneries, dyeing-houses, and distilleries. This town has both a Lutheran and a Roman Catholic church, and a synagogue, with Lutheran, Roman Catholic, and Jewish schools. Fraustadt, situated on the frontiers of Silesia, consists of the old and new town, and has one Lutheran and three Roman Catholic churches, a Roman Catholic gymnasium, a Lutheran school, a convent of Bernhardine monks, an orphan asylum, and other public institutions. The inhabitants are 6257 (mostly Germans), of whom 565 are Jews: they have woollen and linen manufactures, breweries, and distilleries, and carry on a considerable trade in corn, cattle, wool, &c. Kempen, on the Silesian frontier, has 6154 inhabitants, of whom 3474 are Jews, who carry on a considerable trade in horses and goods with Silesia. They have manufactures of cloth, linen, tobacco, and soap.

POSEN. This government is situated between 51° 10′ and 52° 50′ N. lat., and between 15° 7′ and 18° 23′ E. long. It is bounded on the north by Bromberg, on the east by Poland, on the south by Silesia, and on the west by Brandenburg. It is considerably the larger of the two divisions of the province, the area being about 7000 square miles, and the number of inhabitants 788,578 in 1837. This, according to the official returns, is 2451 to a German square mile; whereas that of the whole province was only 2180, and that of the government of Bromberg only 1774 to a German square mile. It is divided into seventeen circles.

POSEN (in Polish, *Posnan*), the capital of the province and of the government of the same name, is situated in 52° 24′ N. lat. and 17° E. long., in a sandy tract on the left bank of the Wartha, where it is joined by the Loyna. It has three suburbs, four gates, and is pretty regularly built. The chief public buildings are—the castle, situated on an eminence; twenty-four Roman Catholic churches, the most remarkable of which are the cathedral and the church of St. Stanislaus, the latter being a masterpiece of Italian architecture; two Protestant churches, a Greek chapel, a synagogue, five convents, one of which is that of the Grey Sisters, who devote themselves to attendance on the sick; the episcopal palace, the theatre, the chief guard-house, the town-hall, &c. There are many useful public institutions, such as a gymnasium, a seminary for priests, another for schoolmasters, a school for midwifery, and numerous schools for children of both sexes, two hospitals, and a poorhouse. Posen is the residence of the archbishop of Posen and Gnesen, of the governor of the province, of the chief president, and is the seat of all the government offices of the province. The inhabitants amount to 32,456 (of whom 6828 are Jews), exclusive of the garrison. They have some manufactures of chintzes, calico, tobacco, leather, woollen cloth, ticking, sealing-wax, and carriages. There are likewise breweries distilleries, several printing-offices and lithographic presses. The city has some trade; the three annual fairs are well frequented, especially that at Midsummer, when all the landholders of the surrounding country attend. It is intended to make Posen a fortress of the first rank. The works were commenced ten years ago, and will probably not be finished for ten years more. Ten millions of dollars have already been expended on them.

Posen is one of the oldest cities in Poland: on the first introduction of Christianity, in the tenth century, it was erected into a bishopric by the emperor Otho I., and became in the thirteenth century the residence of the dukes of Poland. It was a member of the Hanseatic league, and many German, English, and Scotch merchants settled in it, from whom several still existing families claim to be descended.

(Dieterici, *Uebersicht des Verkehrs im Preussischen Staate*, &c., 1838; Hörschelman; Cannabich; Stein; Müller, *Geograph. Wörterbuch des Preussischen Staates*, 1836; Heidemann, *Topographisch-Statistisches Wörterbuch der Preussischen Monarchie*, 1836; Schlieben, *Gemälde der Preussischen Monarchie*, 1830; Official Population Returns for 1837.)

POSIDONIA. [PÆSTUM.]

POSIDO'NIA (Ποσειδῶν, 'Neptune'), a marine genus of fossil conchifera, belonging to the Monomyaria of Lamarck. Goldfuss figures several fossil species from the series of Westphalian rocks lately referred by Mr. Murchison to the carboniforous system, from the Keuper (upper part of the red-sandstone series), and the Lias. The best known foreign species is Posidonia Becheri; a British species very like it occurs in the black-limestone of the culm deposits of central Devon. Much importance is justly attached to the occurrence of these fossils. We have not seen specimens exactly like those from Devonshire in any other part of Britain.

POSIDO'NIUS (Ποσειδώνιος), a Greek philosopher, was a native of Apameia in Syria, but a citizen of Rhodes, where he resided the greater part of his life. (Strabo, xiv., p. 655; Athen., vi., p. 252. e.) The dates of his birth and death are unknown; but he must have been born during the latter half of the second century before the Christian æra, as he was a disciple of Panætius, who probably died about B.C. 100, and whom he succeeded as the head of the Stoic school. He removed to Rome in the consulship of Marcus Marcellus (Suidas, *Posidon.*), B.C. 51, and probably died soon after. He lived, according to Lucian (*Macrob.*, c. 20), to the age of eighty-four.

Posidonius was one of the most celebrated philosophers of his day. Cicero, who had received instruction from him (Cic., *De Fato*, c. 3; *De Nat. Deor.*, i. 3; *De Fin.*, i. 2), frequently speaks of him in the highest terms. Pompey also appears to have had a very high opinion of him, as we read of his visiting him at Rhodes shortly before the war against the pirates, B.C. 67 (Strabo, xi., p. 492), and again in B.C. 62, after the termination of the Mithridatic war. (Plut., *Pomp.*, c. 42; Plin., *Hist. Nat.*, vii. 30)

Posidonius appears to have been a man of very extensive information. Besides his philosophical treatises, he wrote works on geography, history, and astronomy; but none of them have come down to us, with the exception of their titles, and a few sentences quoted by Cicero, Diogenes Laertius, Strabo, and others. He seems to have travelled in different parts of the world for the purpose of collecting information. We learn incidentally from Strabo (xiii., p. 614; iii., p. 165; iv., p. 197), that he had been in Spain, Liguria, and Gaul. Plutarch was also indebted to Posidonius, among others, for the materials of several of his lives. This is the case in the Lives of Marcellus, Paulus Æmilius, the Gracchi, and others; but particularly in the Life of Marius, with whom Posidonius had been personally acquainted. (Plut., *Marius*, c. 45.) Posidonius wrote 'Meteorologica.' Cicero mentions (*Nat. Deor.*, ii. 34) his artificial sphere, which represented the motions of the heavens.

Posidonius was a much stricter Stoic than his master Panætius. [PANÆTIUS.] He maintained that pain was not an evil, as we learn from an anecdote which Pompey frequently related respecting his visit to the philosopher at Rhodes. (Cic., *Tusc. Disp.*, ii. 25.) His works on Divination and the Nature of the Gods are referred to by Cicero, who probably made use of them in his works on the same subject. (Cic., *De Div.*, i. 3, 30, 64; *De Nat. Deor.*, i. 44.)

Strabo says (xi. 492) that Posidonius wrote an account of the wars of Pompey, but did not pay much attention to accuracy. This account was however probably contained in his historical work, of which Athenæus quotes (iv., p. 168. d) the 49th book. (Compare Athen., iv., p. 151. e.) For further information respecting the opinions and writings of Posidonius, see 'Posidonii Reliquiæ Doctrinæ. Collegit atque illustravit Janus Bake. Accedit D. Wyttenbachii Annotatio. Lugduni Bat.' 1810, 8vo.

There was another Posidonius of Alexandria, who was a pupil of Zeno, and consequently was prior to Polybius. Suidas however, by mistake, ascribes to this Posidonius a continuation of Polybius, in fifty-two books, which is evidently the work of the younger Posidonius.

POSI'LIPO, the name of a long hill which forms the boundary of the town and immediate territory of Naples towards the west, and divides it from the district of Pozzuoli. The hill consists of tufo, easily cut and excavated. It is connected on the north with the hill of Sant' Elmo, which commands Naples on the north-west. The hill of Posilipo runs in a south-south-west direction close to the sea-shore for about three miles, terminating in a bold jutting cape facing the small island of Nisita. The side of the hill towards Naples is covered with country-houses and gardens, which enjoy a delightful prospect of the city and bay, and along the base of the hill runs a fine new carriage-road leading to Pozzuoli. The old road from Naples to Pozzuoli passes through a tunnel three-quarters of a mile in length, which perforates the hill in the direction of its breadth, and is called Grotta di Posilipo, and also Grotta di Pozzuoli. This tunnel appears to have been made in the time of the Romans, but it was enlarged by the Spanish viceroys of Naples. It is described by Strabo (p. 246. Casaub.) as wide enough to allow two carriages to pass, and as lighted by holes cut through the mountain from the top: he gives no name to the tunnel. Pliny (ix. 53) mentions Pausilypum as the name of a villa near Naples.

POSITIVE. [Negative.]

POSSE COMITATUS (literally, the power of a county) comprises all able-bodied males within the county between the ages of 15 and 70 years. All such persons, without any exception, are bound to aid the sheriff in all matters that relate to his office; and he is fineable if he neglect to avail himself of their aid. In case of any invasion, rebellion, riot, &c., or breach of the peace within the county, all such persons, on pain of fine or imprisonment, are bound to attend him on being charged by him to do so, and to assist in opposing and suppressing them. They may come armed, and are justified in killing a person in case of resistance. The power of the county may also be raised when necessary for the purpose of apprehending traitors, felons, &c., and that even within particular franchises. It is lawful for any peace-officer, and perhaps even for a private person, to raise a competent number of people for the purpose of opposing and suppressing enemies, rebels, rioters, &c. within the county. But all such persons are punishable if they use unnecessary violence or create false alarms. It is also the duty of the sheriff or any minister of the king having the execution of the king's writs, or process even in a civil nature, who meets with actual resistance in his attempt to execute them, to raise a power sufficient to quell the resistance. (2 Inst., 193, 194; 3 Inst., 161; 1 Hawk., P. C., 152, 156.)

POSSESSION. In endeavouring to explain the legal meaning of this term, we shall commence with the following extracts from Savigny's work on the Right of Possession (*Das Recht des Besitzes*, Giessen, 1827).

'All the definitions of possession are founded on one common notion. By the notion of possession of a thing we understand that condition by virtue of which not only are we ourselves physically capable of operating upon it, but every other person is incapable. This condition, which is called detention, and which lies at the foundation of every notion of possession, is no juristical notion, but it has an immediate relation to a juristical notion, by virtue of which it becomes a subject of legislation. As owership is the legal capacity to operate on a thing at our pleasure, and to exclude all other persons from using it; so is detention the exercise of ownership, and it is the natural state which corresponds to ownership as a legal state. If this juristical relation of possession were the only one, everything concerning it that could juristically be determined, would be comprehended in the following positions:—the owner has the right to possess; the same right belongs to him to whom the owner gives the possession; no other person has this right.

'But the Roman law, in the case of possession, as well as of property, determines the mode in which it is acquired and lost; consequently it treats possession not only as a consequence of a right, but as a condition of rights. Accordingly, in a juristical theory of possession, it is only the rights of possession (jus possessionis) that we have to consider, and not the right to possess (called by modern jurists jus possidendi), which belongs to the theory of property.

'We now pass from the notion of mere detention to that of juristical possession, which is the subject of this treatise. The object of the first part, which is the foundation of the whole investigation, is to determine this notion formally and materially. Formally, by explaining those rights which presuppose possession as a condition, and consequently determining the signification which the non-juristical notion of detention obtains in jurisprudence, in order to its being considered as something juristical, that is, Possession; materially, by enumerating the conditions which the Roman law requires for the existence of possession, and consequently the positive modifications under which detention can be viewed as possession.

'The formal determination of the notion by force of which alone possession can become a subject of jurisprudence, is divided into three parts; first we must determine the place which possession, as a legal relation, occupies in the system of Roman law. We must then enumerate the rights which the Roman law recognises as a consequenceo f possession, and we must also examine the rights which are improperly considered rights of possession. It will then be easy to answer the questions whether possession is to be considered as a right, and whether as a jus in re. The first and simplest mode in which possession appears in a system of jurisprudence consists in the owner having the right to possess; but we are here considering possession independent of ownership, and as the source of peculiar rights; the former of these two questions therefore may be expressed thus—in what sense has possession been distinguished from ownership? a mode of expression which has been used by many writers.

'In the second place we must determine how the different senses in which possession occurs in the Roman law are distinguished from one another by the mode of expression; and particularly what were the significations of possessio generally, and possessio naturalis, and possessio civilis, among the Roman jurists.

'In the whole system of Roman law there are only two consequences which can be ascribed to possession of itself, as distinct from all ownership, and these are usucapion and interdicts.

'The foundation of usucapion is the rule of the Twelve Tables, that he who possesses a thing one or two years becomes the owner. In this case bare possession, independent of all right, is the foundation of property, which possession must indeed have originated in a particular way, in order to have such effect; but still it is a bare fact, without any other right than what such effect gives to it. Accordingly it is possession itself, distinct from every other legal relation, on which usucapion, and consequently the acquisition of ownership, depends.

'Possessorial interdicts are the second effect of possession, and their relation to possession is this: possession of itself being no legal relation, the disturbance of possession is no violation of a legal right, and it can only become so by the circumstance of its being at the same time a violation of a legal right. But if the disturbance of possession is effected by force, such force is a violation of right, since every forcible act is illegal, and such illegal act is the very thing which it is the object of an interdict to remedy. All possessorial interdicts then agree in this: they presuppose an act which in its form is illegal.*

'Now since possessorial interdicts are founded on such acts as in their form are illegal, it is clear why possession, independent of all regard to its own rightfulness, may be the foundation of rights. When the owner claims a thing as his property (vindicatio), it is a matter of perfect indifference in what way the other party has obtained possession of it, since the owner has the right to exclude every other person from the possession of it. The case is the same with respect to the interdict, by which the 'missio in possessionem' is protected: this interdict is not a possessorial interdict, for the 'missio' itself gives no possession, but it gives a right to detention, and this right is made effective in the same way as in the case of property. On the other hand, he who has the bare possession of a thing has not on that account any right to the detention, but he has a right to require from all the world that no force shall be used against him. If however force is used and directed against the possession, the possessor protects himself by means of the interdicts. Possession is the condition of these interdicts, and in this case, as in the case of usucapion, it is the condition of rights generally.

'Most writers take quite a different view of the matter, and consider every violation of possession as a violation of a legal right, and possession consequently as a right of itself, namely, presumptive ownership, and possessorial plaints as provisional vindications. This last, which is the practical part of this opinion, is completely confuted in a subsequent part of this treatise; but it is proper to show here how far such a view is true, as this may be a means of reconciling conflicting opinions. The formal act of illegality above mentioned is not to be so understood, as if possessorial interdicts were a necessary consequence of the independent juristical character of force, and obviously sprung out of it. This consequence of force, namely, that possession of the thing must be restored to the person who has been ejected, without regard to the question whether or not he has any right to the thing, is rather simply a positive rule of law. Now if we ask for the reason of this kind of protection being given against force, that is, why the ejected party should recover the possession to which he may possibly have no title, it may be replied, that the reason is the general presumption that the possessor may be the owner. So far then we may view possession as a shadow of ownership, as a presumed ownership; but this view of the matter only extends to the establishment of the rule of law in general, and not to the legal reason for any particular case of possession. This legal reason is founded rather in the protection against the formal injury, and accordingly possessorial interdicts have a completely obligatory character, and can never be viewed as provisional vindications.'

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* Possessorial interdicts were not limited to cases of violence; they comprehended the three *vitia possessionis*. (Terence, *Eunuch.*, ii. 3; v. 27.)

The special object of Savigny's essay may be collected from these passages. The legal principles here developed are applicable to every system of jurisprudence. There must always be a distinction between the right to possess, which is a legal consequence of ownership, and the right of possession, which is independent of all ownership. The owner of a thing may not have the possession, but he has a right to the possession, which he must prosecute by legal means. The possessor of a thing, simply as such, has rights which are the consequences of his possession; that is, he is legally entitled to be protected against forcible ejection or fraudulent deprivation; his title to a continuance of his possession is good against all persons who cannot establish their right to the thing, and this continued possession may, according to the rules of positive law in each country, become the foundation of ownership. It may be that the acquisition of possession may also be the acquisition of ownership, or that the acquisition of possession may be essential to the acquisition of ownership. Thus, in the case of occupation, the taking possession of that which has no owner, or the acquisition of the possession, is the acquisition of the ownership. Also, when a thing is delivered by the owner to another, to have as his own, the acquisition of the possession is the acquisition of the ownership. In these examples, ownership and possession are acquired at the same time, and there is no right that belongs to the possessor as possessor; his rights are those of owner. But the form and mode of the acquisition of the possession, viewed by itself as distinct from the acquisition of the ownership, will also be applicable to the cases of possession when possession only is acquired. For possession of itself is a bare fact, though it has legal consequences; and being a bare fact, its existence is independent of all rules of the civil law or of the jus gentium, as to the acquisition and loss of rights. (Savigny, p. 25.)

Having shown that in the Roman law all juristical possession has reference to usucapion and interdicts, and that the foundation of both is a common notion of juristical possession, Savigny proceeds to determine the material conditions of this notion.

In order to lay the foundation of possession as such, there must be detention, and there must also be the intention to possess, or the 'animus possidendi.' Consequently the 'animus possidendi' consists in the intention of exercising ownership. But this ownership may either be a person's own ownership or that of another: if the latter, there is no such 'animus possidendi' as makes detention amount to possession. In the former case a man is a possessor, because he treats the thing as his own: it is not necessary that he should believe it to be his own.

Whether then we are considering possession as such, or that possession which is concurrently acquired with ownership, or which complete the acquisition of, or is the exercise of, ownership, the material facts of possession are the same. When ownership is transferred from one man to another, every system of law must require some evidence of it. But the evidence of the transfer of ownership may be entirely independent of the evidence of acquisition of possession; and also the evidence of the acquisition of possession may be inseparable from that of the acquisition of ownership. There must then generally be some act which shall be evidence of the acquisition of possession, whether possession as such is obtained without ownership, or possession accompanied by ownership, or possession as necessary to the complete acquisition of ownership, or possession as simply the exercise of ownership.

Bracton, the oldest law writer from whom we obtain any comprehensive notion of our whole system, has framed his notions of possession on and borrowed his definitions from the Roman law. Whether he has always rightly understood them is a matter that would require a very careful investigation.

Bracton (c. 17) uses possessio and seisina as synonymous. He observes that it is not sufficient for one man's right to be transferred to another, unless that other obtain 'seisina;' and he adds, 'possessio sive seisina multiplex est.' He defines possessio to be 'corporalis rei detentio i., corporis et animi cum juris adminiculo concurrente.' He therefore limits it to corporeal things, for incorporeal things are incapable of tradition or delivery, but may be said 'quasi possideri;' and he requires both the corporeal act and the animus, together with right, in order to give possessio, which, thus understood, is complete ownership. Accordingly verus possessor is owner. (Fleta, iii., c. 3, s. 1.) He divides possessio into 'civilis, quæ animo tantum tenetur,' that is, in which there is an intention to hold; and 'naturalis, quæ corpore;' and this latter may be just, that is, with good title; or unjust, that is, without good title. To acquire complete possession, it must be acquired 'animo et corpore:' there must be both the mental affection (*possidendi affectus*, as Bracton elsewhere calls it, fol. 40) and the corporeal act; possession can only be completely lost 'animo et corpore,' for it may be lost 'corpore,' and retained 'animo.' Among various kinds of possession he enumerates nuda, where a person has no right to the thing; and vestita, where he has 'jus, titulus, tempus.' As an instance of a case, where there is 'nihil juris in re, sed aliquid possessionis,' he mentions the case of a man being seised or possessed by intrusion. As another kind of possession, but which is manifestly distinguishable from the others, he mentions the possession of a custos, creditor, or any person of the kind. These examples will be sufficient to show that the senses of possessio at that time were very various. The essential part of all of them is detentio.

In the transfers of freeholds, mentioned by Bracton, traditio or livery is defined to be 'in possessionem inductio de re corporali;' as soon as this traditio is made by the owner, the person to whom it is made has 'liberum tenementum,' a freehold estate (Bracton, fol. 39), 'propter conjunctionem juris et seisinae et mutuum utriusque partis consensum.'

A person who held land for a term of years (firmarius) had no 'liberum tenementum' (fol. 27), but he was certainly said 'possidere,' but there was not the 'conjunctio juris et seisinae,' that is, a possessio which made a liberum tenementum. Again (c. 15), when Bracton is treating of one cause or title of possession being turned into another, he says that he who has the usus fructus and the terminus, or term of years, may, during its continuance, and while he is thus in possession, acquire 'liberum tenementum,' if the proper formalities are observed, 'so that there shall not be wanting proof of the new acquisition.' It appears that the owner (dominus) was not said to possess during the continuance of the term; for it is said (fol. 32) 'that the donor and true owner, with the consent of the tenant (tenens), might change one title of possession into another without any change of the possession; nor is it necessary to resume the thing that has been once given and possessed, in order that it may be possessed by a new title.'

It remains to attempt to show some of the many senses in which possession has been or is still used in English law. There seems to have been always a fundamental distinction as to the use and meaning of this word, between land and moveable chattels, of which something more will presently be said. Some of our old writers make the following division of possession as applied to land: 'Possession is actual and in law: *actual* possession is when a man actually enters lands and tenements to him descended; possession *in law* is when lands and tenements descend to a man, and he hath not yet actually entered into them.' (Staundf., *Pl. Cor.*, fol. 198; Cowel.) Now, this actual possession, that is, possessio according to Bracton's definition, is the only possession included in this definition, that is, properly so called. The possession in law is merely the owner's right to possess. This possession in law, that is, ownership and the right to possess, is not full ownership, for if the right to possess is not exercised, that is, does not become an actual possession, it will be lost in course of time. (3 & 4 Wm. IV., c. 27.) It becomes an actual possession by entry, that is, by the owner entering on the land or exercising ownership over it. What shall be sufficient to constitute entry so as to give the owner all the advantages of actual possession, may sometimes be difficult to determine; but actual entry is not always necessary for that purpose. The receipt of the rent from a lessee for years, who has the actual possession of the land, gives to the owner all the legal advantages which are derived from his actual entry.

A lessee for years, who pays a rent, has the actual possession of the premises, and if the landlord enters the premises, except when rent is in arrear, or by virtue of the covenants in the lease, he is a trespasser. Still the owner who receives the rents is often said, in a sense, to be in possession, though he may never have had actual possession. This sense of possession is that which is expressed in the recent Statute of Limitations by the words 'receipt of the profits.' It might be called 'legal possession,' as it is for many purposes a possession which gives all the advantages of actual possession. But since 'legal possession' has been used in a different sense, as will be shown hereafter, the expression cannot conveniently be applied in the case here considered. Nor can we use the phrase 'possession in law;' for that, as above defined, is the owner's right to possess, that is, his present right to actual possession, which in the case here supposed, the owner has not. There appears then to be no one term, except possession simply, that can be used to express that kind of possession of land which a man has who has merely received rent from a lessee.

The old form of conveying a present freehold interest in land was by feoffment, that is, by livery of seisin, or actual delivery of the possession upon the land by the owner, in the presence of witnesses, to the donee or purchaser. Without this ceremony no ownership was transferred. Formerly no writing was necessary in the case of a feoffment. A written instrument is now required (29 Chas. II., c. 3), but the ownership is not transferred without livery of seisin; that is, though one party has agreed to sell and the other to buy, actual possession must be taken by the purchaser in the form required by law. If a lease for years is made to a man at common law, though he thereby acquires an immediate interest in the land (interesse termini), he has no estate till he enters: actual possession is necessary to give him this. The Statute of Uses made a considerable change by enabling a man to acquire an estate in land without actual entry; but the statute does not give him all the advantages of actual entry, or of that which is legally equivalent to actual entry. This leads us to another meaning of the word possession, which is that of vested estate. (Preston, *Conveyancing*, ii. 389.) The words of a bargain and sale under the Statute of Uses, are, 'to the intent and purpose that by virtue of these presents and of the statute for transferring uses into *possession*, the said A. B. may be in the *actual possession* of the premises, and be thereby enabled to take and accept a grant and release of the freehold, reversion, and inheritance,' &c. Possession here means an estate such as under the old law a lessee obtains upon entry; and it may be one which entitles the bargainee to an immediate possession; but it may also be an estate which does not entitle him to immediate possession. There can therefore be no actual possession in the sense in which that word is properly understood and legally defined. If the bargainee is entitled to the immediate possession, but has not entered, he cannot maintain an action of trespass; for in such action he must declare that he is possessed, which means actually possessed. The actual possession of land in right of a freehold estate is called seisin, a word which therefore imports both actual possession and right. Thus, 'things are said to lie in livery when the person in whom the first estate of freehold is vested, has the possession of land in right of this estate.' (Preston, *Estates*, i. 13.)

Possession, when coupled with the word estate, means a present right to possess. 'An estate in possession gives a present right of present enjoyment;' 'an estate in reversion gives a present right of future enjoyment.' (Preston, *Estates*, i. 89.) In this sense of possession, an estate in possession is opposed to an estate in remainder or reversion; but it does not imply actual possession. In the third section of the Act for the Limitations of Actions and Suits (3 & 4 Wm. IV., c. 27), an 'estate or interest in possession' is opposed to an 'estate or interest in reversion or remainder,' and the actual possession of land is referred to in the same section by the terms 'possession or receipt of the profits of the land.' [Statute of Limitations.]

A man is said to be *seised* of a freehold estate; but he is said to be *possessed* of a chattel real. The Statute of Uses does not apply to chattels real.

It remains to speak of a distinction in the word possession as applied to a real estate and a chattel personal. Both may be possessed, but the legal conclusion from the bare fact of possession is different in the case of a real estate and of a personal chattel. 'There is a marked difference between a real estate and a personal chattel: the latter is held by possession; a real estate, by title. Possession of an estate is not even *primâ facie* title. It may be by lease only or from year to year.' (Lord Eldon, Hiern *v.* Mill, 13 Ve., 114.) This seems to mean that, in the case of a chattel, possession is a presumption of ownership; but that possession of land is not; at least not a presumption of a freehold interest. Still it is so far a presumption of some interest, that if a man buys an estate from the owner, knowing that another man is in possession of it, he has notice of whatever interest the person in possession may have in the land; and therefore if the person in possession has a prior contract with the owner for purchasing the land, the second purchaser buys subject to the interest of the person in possession. (Daniels *v.* Davison, 16 Ve., 249; 17 Ve., 433.)

It has been already stated that *actual* possession of land, or what is legally considered actual possession, is necessary in order to give the owner all the advantages of ownership. In the case of chattels personal, ownership is frequently acquired without or rather before actual possession, and it may always be so acquired by contract when the thing agreed to be bought and sold is clearly determined. Sometimes the ownership can only be acquired together with the possession, because the thing only becomes determined by the act of delivery or taking possession. In all cases however when personal chattels are bought and sold, it is often a matter of great nicety to determine whether there has been possession by the purchaser, either as the condition or means of establishing his ownership, or for the purpose of ascertaining from what time a thing has ceased to be in one person's possession and come into the possession of another.

Questions as to this matter often arise in cases of loss, of insolvency of a vendee, &c., when the chattel is transferred from the vendor to the vendee by being *sent*, in which case it is of necessity during a certain time on its journey, or as our law expresses it, *in transitu*. The solution of questions of this kind, which often occur in a commercial country, is sometimes difficult, though many general principles are deducible from judicial decisions. The right of the vendor to stop the thing after it has commenced its journey, continues till the time at which the vendee is legally considered to have acquired possession. [Stoppage in Transitu.]

It is remarked by Savigny (*Das Recht des Besitzes*, p. 185), 'that in the whole theory of possession nothing seems easier to determine than the character of corporeal apprehension which is necessary to the acquisition of possession. By this fact all writers have understood an immediate touching of the corporeal thing, and have accordingly assumed that there are only two modes of apprehension: laying hold of a moveable thing with the hand; and entering with the foot on a piece of land. But as many cases occur in the Roman law in which possession is acquired by a corporeal act, without such immediate contact, these cases have been viewed as symbolical acts, which, through the medium of a juristical fiction, become the substitute for real apprehension.' After showing that this is not the way in which the acquisition of possession is understood in the Roman law, and that there is no symbolical apprehension, but that the acquisition of possession may in all cases be referred to the same corporeal act, he determines what it is, in the following manner:

'A man who holds a piece of gold in his hand is doubtless the possessor of it; and from this and other similar cases has been abstracted the notion of a *corporeal contact generally* as the essential thing in all acquisition of possession. But in the case put, there is something else which is only accidentally united with this corporeal contact, namely, the physical possibility to operate immediately on the thing, and to exclude all others from doing so. That both these things concur in the case put, cannot be denied: that they are only accidentally connected with corporeal contact, follows from this, that the possibility can be imagined without the contact, and the contact without the possibility. As to the former case, he who can at any moment lay hold of a thing which lies before him, is doubtless as much uncontrolled master of it as if he actually had laid hold of it. As to the latter, he who is bound with cords has immediate contact with them, and yet one might rather affirm that he is possessed by than that he possesses them. This physical possibility then is that which as a fact must be contained in all acquisition of possession: corporeal contact is not contained in that notion, and there is no case in which a fictitious apprehension need be assumed.'

This clear exposition of a principle of Roman law is applicable to all systems of jurisprudence which have received any careful elaboration, for the principle is in its nature general. It may be that the expounders of our law have not always clearly seen this principle, even when they have recognised it; and it may be that they have not always acted upon it. Still it will appear from various cases that the physical possibility of operating on a thing is the essential character of the acquisition of possession in English law. In the case of Ward *v.* Turner (2 Vez., 431) it was held by Lord Hardwicke that delivery of the thing was necessary in a case of 'donatio mortis causâ,' and delivery of receipts for South Sea Annuities was not held sufficient to pass the ownership of the annuities. In his judgment, Lord Hardwicke observed, 'delivery of the key of bulky things, where wines, &c. are, has been allowed a delivery of the possession, because it is the way of coming at the possession, or to make use of the thing; and therefore the key is not a symbol, which would not do.' In one of his chapters (§ 16, *Apprehension beweglichen Sachen*) Savigny uses the very same example of the key, showing that it is not a symbol, but the means of getting at things which are locked up, and therefore the delivery of the key of such things, when they are sold, is a delivery of the possession. (See the cases in the *Digest* cited by Savigny, p. 209.)

In a case (Williams *v.* Bosanquet, 1 Br. and B., 238) where a lease had been assigned by the lessee to a mortgagee as a security, the mortgagee was held liable to pay the rent, though he had never taken actual possession of the premises. The safest ground of this judgment seems to be that the contract of the lessor is with the lessee and his assigns, and the mortgagee is the assign of the lessee; it is therefore a contract between the lessor and the mortgagee; and as the lessee is liable to pay the rent though he never takes actual possession, so must the assignee be liable even if he does not take possession. Whether the assignee is also mortgagee or not, makes no difference as to this question. But it was also stated in the judgment (p. 263) that 'legal possession,' that is, acceptance of the thing assigned by acceptance of the assignment, is 'equivalent to actual entry,' that is, to actual possession. This can only mean that such so-called legal possession, which is simply 'the right to possess,' must be considered the same as actual possession, so far as the liabilities of the owner of such lease are concerned. But such possession is not equivalent to actual possession for the purpose of preventing the Statute of Limitations from running against the assignee, for the statute views the commencement of such legal possession as the commencement of the time when the assignee ought to take actual possession.

Opinions may vary as to what shall be the evidence of that physical possibility which is the characteristic of apprehension; but it can hardly be disputed that this is the principle to which particular cases must be referred. 'All possession then depends on the consciousness of unlimited physical dominion; in order to which there must be the will (animus) to treat the thing as our own; and there must be the physical conditions of that possibility (corpus), the consciousness of which is necessary.' (Savigny, p. 228.) Possession may be acquired through a man's agent, as well as by the man himself who wills to possess.

The animus which is necessary to the possession may often be inferred from the acts. When, in the case supposed, the vendor gives the key to the buyer, it must be assumed that delivery is intended on one side and the taking of possession on the other. If a man buys a cask of wine in a merchant's cellar, and puts his mark on it, this is no taking possession, but the object is to identify his property; if he marks timber lying in an open place, which he has purchased, this is a taking possession.

The principle seems to apply to choses in action. The question often arises in the cases of a wife's choses in action, what shall be considered a reduction of them into possession by the husband. In this case it is not necessary to a reduction into possession, that the husband shall actually have material contact of the thing; but he must have acquired such a power over it as will prevent any other person from getting it. If he has not done this, he has not reduced it into his possession. If a promissory note is given to a wife, and the husband only receives the interest on it during his life, it will belong to the wife if she survives him. (Nash *v.* Nash, 2 Mad.) If stock in the funds be bequeathed to a married woman, and the executor transfer it into her name, in which it continues till her husband's death, it devolves to the wife if she survives him. It seems that if a husband can sue alone for his wife's chose in action (which he can do if it accrue to her during the coverture), and if he obtain a judgment before he dies, that will entitle his personal representatives to the benefit of it; and probably a decree of a court of equity in favour of a husband, in right of his wife, would, if he dies before he receives the thing, entitle the husband's personal representatives to the benefit of the decree. ('Forbes *v.* Phipps, 1 Eden, 502; Jarman, *Settlements*, 'Precedents,' vol. ix., p. 22.)

It is still doubtful whether the assignment by a husband of his wife's immediate choses in action is a reduction into possession. It is very difficult to comprehend on what principle it should be considered a reduction into possession, except in the case of bills of exchange or promissory notes, on which the assignee sues in his own name. In the case of the husband's bankruptcy, the assignees are not entitled to the property unreduced into possession, against the surviving wife. (Jarman, *Settlements*, 'Precedents,' vol. ix.)

According to Blackstone (ii. 13), 'actual occupation of land without any right is *bare possession*, but such actual possession is *primâ facie* evidence of a legal title in the possessor, and it may in time become a perfect title.' This is properly the right of possession, that right which presupposes the condition of legal possession. Blackstone's 'right of possession,' which he speaks of in the same chapter, is the owner's right to possess, when he does not actually possess. The singular confusion of this chapter, and particularly of the third section, in which the author treats of the 'mere right of property, without either possession or even the right of possession,' that is, the right to possess, is not wholly due to the author, but partly belongs to the old system of our law and to the various legal remedies formerly applicable to the recovery of land. (See also Blackstone, iii., c. 10, 'On Possessory Actions,' &c.) In the case of personal chattels, 'right of possession' is sometimes used by the judges to signify the right to possess, as distinguished from actual possession. (Bloxam *v.* Sanders, 4 B. and C., 948.) But the English law admits a right of possession' as distinct from property and from the right to possess; as for instance, in the case of a man finding a thing, 'who has such a property as will enable him to keep it against all but the rightful owner.' The law therefore admits a right founded on the antecedent condition of a lawful possession only, or, as it is sometimes called, a bare possession. In like manner as to land, a *bare possessor* can maintain an action of trespass against a wrong doer.

POST-OBIT BOND (*Post Obitum*, Lat.), a bond given for the purpose of securing a sum of money, the condition of which is, that the money shall be paid on the death of some person.

POST-OFFICE.—*History*. Correspondence is the offspring of advanced civilization. When the state of society in this country anterior to the seventeenth century is considered, there can be little surprise that we hear nothing of a post-office before that period. Few of the motives to written communication could be said to exist. Each district of the country supplied its own wants. The little foreign trade which flourished was conducted between the English buyer and the foreign seller in person, at the port where the import was made. Literature and science dwelt only in the convent or the cell. There was little absence from the domestic hearth, excepting that of the fighting man following the service of his lord; but neither the serf nor his master had the power, even if they had the will, to write letters. The business of the state only demanded correspondence. The king summoned his barons from all quarters of the kingdom by letters or writs, and held frequent communication with his sheriffs, to collect his parliament together, to muster his forces, to preserve his peace, to fill his treasury. The expenses of the establishment of Nuncii, charged with the conveyance of letters, formed a large item in the charges of the royal household. As early as the reign of King John, the payments to Nuncii for the carriage of letters may be found enrolled on the Close and Misæ-Rolls, and these payments may be traced in an almost unbroken series through the records of subsequent reigns. Nuncii also formed part of the establishment of the more powerful nobles. In a wardrobe account of 27th year of Edward I., we find a specimen of the mode in which the payment is entered:—'x die Januarii nuncio Domini Regis de Hastang redeunti ad eundum dominum suum cum litteris Regis, pro expensis suis sic redeundo—xiii.' As correspondence grew, it is easy to see that economical arrangements for its transmission would grow likewise. The Nuncius of the time of King John was probably obliged to provide his own horse throughout his journey; whilst in the reign of Edward II. he was able, and found it more suitable, to hire horses at fixed *posts* or stations. In 1481, Edward IV., during the Scottish war, is stated by Gale to have established at certain posts, 20 miles apart, a change of riders, who handed letters to one another, and by this means expedited them 200 miles in two days. It would seem that the posts, at which relays of riders and horses were kept, were wholly private enterprises; but that when their importance became felt and appreciated, the state found it both politic and a source of profit to subject them to its surveillance. Before any substantive evidence appears of the superintendence of the posts by the government, the superscription often met with, of 'haste poste haste,' on letters written at the close of the fifteenth and beginning of the sixteenth centuries, is sufficient to show that the posts had become the customary channel for transmitting letters in the speediest way.

A statute in 1548 (2 and 3 Edw. VI., c. 3) fixed a penny a mile as the rate to be chargeable for the hire of post-horses. In 1581, one Thomas Randolph is mentioned by Camden as the chief postmaster of England; and there are reasons for concluding that his duties were to superintend the posts, and had no immediate connection with letters. The earliest recital of the duties and privileges of a postmaster seems to have been made by James I. The letters patent of Charles I. in 1632 (*Pat.*, 8 Car. I., p. i., m 15 d; *Fœdera*, vol. 19, p. 385) recite that James constituted an office called the office of postmaster of England for foreign parts being out of his dominions. This functionary was to have 'the sole taking up, sending, and conveying of all packets and letters concerning his service, or business to be despatched into forraigne parts, with power to grant moderate salaries;' the office was graunted to Mathewe le Quester, and Mathewe le Quester his son: all others were publiquely prohibited that they should not directly or indirectly exercise or intrude themselves: the said M. le Quester made and substituted William Frizell and Thomas Witherings his deputies, and his Majesty accepted the substitution. The king, 'affecting the welfare of his people, and taking into his princely consideration how much it imports his state and this realm that the secrets thereof be not disclosed to forreigne nations, which cannot be prevented if a promiscuous use of transmitting or taking up of forreigne letters and packetts should be suffered,' forbids all others from exercising that which to the office of such postmaster pertaineth, at their utmost perils.

In 1635 a proclamation was made 'for settling of the letter-office of England and Scotland.' It sets forth 'that there hath been no certain or constant intercourse between the kingdoms of England and Scotland;' and commands 'Thomas Witherings, Esq., his Majesty's postmaster of England for foreign parts, to settle a running post or two, to run night and day between Edinburgh and Scotland and the City of London, to go thither and come back in six days.' Directions are given for the management of the correspondence between post-towns on the line of road and other towns which are named, and likewise in Ireland. All postmasters are commanded 'to have ready in their stables one or two horses:' 2½*d.* for a single horse and 5*d.* for two horses per mile were the charges settled for this service. A monopoly was established, with exceptions in favour of common known carriers and particular messengers sent on purpose, most of which have been preserved in all subsequent regulations of the Post-office. In 1640 a proclamation was made concerning the sequestration of the office of postmaster for foreign parts, and also of the letter-office of England, into the hands of Philip Burlamachy of London, merchant; but in 1642 it was resolved by a committee of the House of Commons that such sequestration was 'a grievance and illegal, and ought to be taken off,' and that Mr. Wytherings ought to be restored. As late as 1644 it appears that the postmaster's duties were not connected directly with letters. A parliamentary resolution entered on the Journals of the Commons states that 'the Lords and Commons, finding by experience that it is most necessary, for keeping of good intelligence between the parliament and their forces, that post stages should be erected in several parts of the kingdom, and the office of master of the posts and couriers being at present void, ordain that Edmund Prideaux, Esq., a member of the House of Commons, shall be, and is hereby constituted, master of the posts, messengers, and couriers.' 'He first established a weekly conveyance of letters into all parts of the nation, thereby saving to the public the charge of maintaining postmasters to the amount of 7000*l.* per annum.' (Blackstone.) An attempt of the Common Council of London to set up a separate Post-office, in 1649, was checked by a resolution of the House of Commons, which declared 'that the office of postmaster is, and ought to be, in the sole power and disposal of parliament.'

But the most complete step in the establishment of a Post-office was taken in 1656, when an act was passed 'to settle the postage of England, Scotland, and Ireland. This having been the model of all subsequent measures, induces us to give something more than a passing notice of it. The preamble sets forth 'that the erecting of one General Post-office for the speedy conveying and recarrying of letters by post to and from all places within England, Scotland, and Ireland, and into several parts beyond the seas, hath been and is the best means not only to maintain a certain and constant intercourse of trade and commerce between all the said places, to the great benefit of the people of these nations, but also to convey the publique despatches, and to discover and prevent many dangerous and wicked designs which have been and are daily contrived against the peace and welfare of this commonwealth, the intelligence whereof cannot well be communicated but by letter of escript.' It also enacted that 'there shall be one Generall Post-office, and one officer stiled the postmaster-generall of England and comptroller of the Post-office.' This officer was to have the horsing of all 'through' posts and persons 'riding in post. Prices for letters, both English, Scotch, Irish, and foreign, and for post-horses, were fixed. All other persons were forbidden to 'set up or imploy any foot-posts, horse-posts, or pacquet-boats.' These arrangements were confirmed in the first year of the Restoration by an act which was repealed 9 Anne, c. 11. In 1683, a metropolitan penny-post was set up, the history of which is given at length in the 'Ninth Report of the Commissioners of Post-office Inquiry.' From 1711 to 1838, upwards of 150 acts affecting the regulations of the Post-office were passed. In the first year of Her present Majesty ninety-nine of these were repealed, either wholly or partially, and the following acts were passed, by which the whole department of the Post-office was regulated:

For the management of the Post-office, c. 33.

The regulation of the duties of postage, c. 34.

For regulating the sending and receiving of letters and packets by the post free from the duty of postage, c. 35.

For consolidating the laws relative to offences against the Post-office, and explaining certain terms and expressions, c. 36.

A mere enumeration of the titles of all the acts affecting the Post-office would occupy a considerable space An account even of these four last-mentioned acts must be dispensed with, and the reader referred to the acts themselves. Their enactments have been abrogated, to a great extent, by the adoption of Mr. Rowland Hill's plan of uniform postage, which we shall notice hereafter. This measure, which has placed the Post-office, at the time we are now writing, in a state of total transition, so that what is in practice to-day falls into disuse on the morrow, was carried into effect by an act passed in 1839, 2 and 3 Vic., cap. 52, which conferred temporary powers on the Lords of the Treasury to do so, and was subsequently confirmed by an act 3 and 4 Vic., c. 96, passed 10th August, 1840.

Rates of Postage.—The first establishment of a rate of postage for carrying letters occurs in 1635, in the proclamation already described. The rates were fixed as follows:—

Under 80 miles	2*d.*	single letter.
Between 80 miles and 140 miles .	4	„
Above 140 miles	6	„
On the borders and in Scotland .	8	„

'Two, three, four, or five letters in one packet, or more, to pay according to the bigness of the said packet.'

The rates, both inland and foreign, fixed by the ordinance of the Commonwealth in 1656, are therein fully detailed. Letters above two sheets were charged by weight. In most cases the rates vary but little from those fixed in the 12 Car. I., the principal of which were as follows:—

Letter not exceeding one sheet, to or from any place not exceeding 80 miles, 2*d.*; above 80 miles, 3*d.* From London to Berwick, 3*d.*; to Dublin, 6*d.* Letters of two sheets were charged double. By the 9 Anne, c. 11, a penny was added to several of the rates previously established; a letter from London to Edinburgh was charged 6*d*. The additions subsequently made appear in the following table:—

A Table showing the Scale of Distances according to which the Postage of Great Britain was charged, with the Rates levied for those Distances, from the year 1710 to Dec. 5, 1840.

SCALE OF DISTANCES.	1710.	1765.	1784.	1797.	1801.	1805.	1812.
ENGLAND.	*d.*	*d.*	*d.*	*d.*	*d.*	*d.*	*d.*
From any Post-office in England or Wales to any place not exceeding 15 miles from such office .	3	1	2	3	3	4	4
For any distance above 15 miles, and not exceeding 20 miles	3	2	3	4	4	5	5
Above 20 miles, and not exceeding 30 miles. .	3	2	3	4	4	5	6
— 30 . . . . 50 — . .	3	3	4	5*d*. between 30 and 60 miles; 6*d*. between 60 and 100 miles; 7*d*. between 100 and 150 miles; 8*d*. above 150 miles.	5	6	7
— 50 . . . . 80 — . .	3	3	4		6	7	8
— 80 . . . . 120 — . .	4	4	5		7	8	9
— 120 . . . . 170 — . .	4	4	5*d*. under 150 m. 6*d*. above 150 m.		8	9	10
— 170 . . . . 230 — . .	4	4	6	8	9	10	11
— 230 . . . . 300 — . .	4	4	6	8	10	11	12
— 300 . . . . 400 — . .	4	4	6	8	11	12	13
— 400 . . . . 500 — . .	4	4	6	8	12	13	14
And so on in proportion, the postage increasing progressively 1*d*. for a single letter for every like excess of distance of 100 miles.							

These rates were applied to general-post letters passing from one post-town to another post-town. The principle of the rating was to charge according to the distance which the conveyance travelled, until the year 1839, when the direct distance only was charged. A single letter was interpreted to mean a single piece of paper, provided it did not exceed an ounce in weight. A second piece of paper, however small, or any inclosure, constituted a double letter. A single sheet above an ounce was charged with fourfold postage. After a fourfold charge, the additional charges advanced by weight.

In Scotland, letters, when conveyed by mail-coaches only, were subject to an additional halfpenny. Letters passing between Great Britain and Ireland were subject to the rates of postage charged in Great Britain, besides packet rates, and Menai, Conway Bridge, or Milford rates.

Between 1814 and 1839, the rates in Ireland were as follows:—

Distances in Irish Miles.	Rates for Single Letters.	Distances in Irish Miles.	Rates for Single Letters.
7	2*d*.	95	9*d*.
15	3	120	10
25	4	150	11
35	5	200	12
45	6	250	13
55	7	300	14
65	8		

The Postmaster-general had authority to establish penny posts for letters not exceeding in weight four ounces, in, from, or to, any city, town, or place in the United Kingdom (other than London or Dublin), without any reference to the distance to which the letters are conveyed.

The principle which guided the department in establishing penny posts, was to select small towns and populous neighbourhoods, not situated in the direct lines of general-post conveyances, and desirous of obtaining that facility, wherever such penny post did not afford the means of evading the general post, and promised to yield a return that would pay for its maintenance. The rule was to consider whether the receipts on the first setting up of the post would pay about two-thirds of the charge. The Post-office took its chance of the remainder being made good. There is a penny post for Dublin, the limits of which the Postmaster-general has authority to alter.

The London Twopenny Post extended to all letters transmitted by the said post in the limits of a circle of three miles' radius, the centre being the General Post-office in St. Martin's le Grand; which limits the Postmaster-general had authority to alter. The London Threepenny Post extended to all letters transmitted by the said post beyond the circle of three miles' radius, and within the limits of a circle of twelve miles' radius, the centre being the General Post-office.

The Select Committee of the House of Commons in 1838 and 1839, which investigated Mr. Rowland Hill's plan, reported the following to be the average rates of postage:—

Average rates, Multiple Letters being included and counted as Single.

	d.	*d.*
Packet and ship letters . .	23·1562 = nearly	23¼
——— and inland general-post letters	9·7065 = nearly	9¾
Ditto, ditto, and London 2*d*. and 3*d*. post letters . . .	8·4006 = nearly	8½
Ditto, ditto, ditto, and country 1*d*. post letters	7·6074 = little more than	7½
Inland general-post letters only	8·6502 = nearly	8¾
Ditto and London 2*d*. and 3*d*. post letters	7·4688 = nearly	7½
Ditto, ditto and country 1*d*. post letters	6·7414 = nearly	6¾

Average rates, Multiple Letters being excluded.

Single inland general-post letters	7·7445 = nearly	7¾
Ditto and London 2*d*. and 3*d*. post letters	6·8202 = little more than	6¾
Ditto, ditto, and country 1*d*. post letters	6·2166 = nearly	6¼

Franking.—As early as a post-office was established, certain exemptions from the rates of postage were made. Parliamentary franking existed in 1666. An entry is registered on the Journals of the House of Commons on 19th October, 1666, 'That Edward Roberts be sent for in custody of the serjeant-at-arms or his deputy to answer his abuse and breach of privilege in exacting money of the members of this House for post letters.' In the paper bill which granted the post-office revenue to Charles II. a clause provided that all the members of the House of Commons should have their letters free, which clause was left out by the lords, because no similar provision was made for the passing of their letters, but a compromise was made on the assurance that their letters should pass free.

In 1735 the House of Commons prosecuted some investigations into the subject, which appear on the Journals. Again, in 1764 (4 Geo. III.), a committee was appointed 'to inquire into the several frauds and abuses in relation to the sending or receiving of letters and parcels free from the duty of postage.' Among various abuses proved to exist, it is related that 'one man had in the course of five months counterfeited 1200 dozen of franks of members of parliament, and that a regular trade of buying and selling franks had been actually established with several persons in the country.' Resolutions restricting and regulating the privilege were passed. From time to time the privilege was extended, until it was finally abolished, with a very few exceptions, on 10th January, 1840.

Seven millions of franks, out of sixty-three millions of general-post letters, including franks, were estimated in 1838 to pass through the Post-office annually. The relative quantities of these several documents are given in the 'Third Report of the Commons' Committee;' as follows:—

				Single Letters.
56,000,000	of general-post chargeable letters, equivalent at	1⅛	to	63,000,000
4,813,448	parliamentary franks	2	to	9,626,896
2,109,010	official franks	8	to	16,872,080
77,542	copies of the statutes	13	to	1,008,046
63,000,000				90,507,022

The privileged letters therefore, reduced to the standard of single letters, amounted to above 30 per cent. of the whole number of letters transmitted by the general post.

The average weight of a single chargeable letter was about 3-10ths of an ounce; the average weight of a parliamentary frank about 48-100ths of an ounce; that of an official frank 1·9376 oz., or nearly two ounces; and that of a copy of a public statute 3·1129 oz. Had they been liable to the then existing rates, they would have contributed in the following proportions to the revenue:—

	Number.	Rate per Letter.	Revenue.
		d.	£.
Parliamentary franks	4,813,448	17·392	348,814
Official franks	2,109,010	70·209	616,965
Statutes distributed	77,542	112·795	36,443
Totals	7,000,000	...	1,002,222

Newspapers with a few exceptions pass free of postage. All franking is now altogether abolished.

Revenue.—The statistics of the Post-office revenue are far from complete. In the early period of the Post-office establishment, and before 1716, only a few scattered accounts can be collected. In 1653 the annual revenue was farmed for 10,000*l.*, and in 1659 for 14,000*l.* (Journals of the Commons.) In 1663 it was farmed for 21,500*l.* annually, and the amount settled on the Duke of York. In 1674 the farming of the revenue yielded 43,000*l.* In 1685 it produced 65,000*l.* Parliament resumed the grant after 1688, though the king continued to receive the revenue. In 1711 the gross revenue was reckoned at 111,426*l.* From 1716 to 1733 the average yearly net revenue was 97,540*l.*, founded upon 'a certain account and not an estimate.' (Commons *Journals*, April 16, 1735.) In the Postage Reports of 1838 (vol. ii., App., p. 176; vol. i., p. 511) are accounts showing the gross receipt, charge of management, net receipt, and rate per cent. of collection in Great Britain from 1758 to 1837, and in Scotland and Ireland from 1800 to 1837. The accounts for a few years will serve to show its progress.

GREAT BRITAIN.

Years ended 5 April.	Gross Receipt.	Charges of Management.	Net Receipt (returns deducted).	Rate per cent. of Collection.		
	£	£	£	£	*s.*	*d.*
1758	222,075	148,345	73,730	66	15	11
1769	305,058	140,298	164,760	45	19	9
1779	402,918	263,670	139,248	65	8	9
1786	506,500	220,525	285,975	43	10	9
1799	1,012,731	324,787	657,388	32	1	4
1816	2,193,741	594,045	1,526,527	27	1	6
1837	2,206,736	609,220	1,511,026	27	12	1

SCOTLAND.

Years.	Gross receipts.			Charges of Collection.			Net income.			Rate per cent. for collection.
	£	*s.*	*d.*	£	*s.*	*d.*	£	*s.*	*d.*	£
1800	100,651	14	4	16,896	8	0	83,755	6	4	16¾
1837	220,758	13	10	59,945	7	1	160,813	6	9	27

IRELAND.

			Returns deducted.			
1800	84,040	59,216	24,824	70	9	2
1837	255,070	95,548	134,809	37	9	2

The revenue for the United Kingdom for the years ended 5 January, 1838 and 1839, was as follows:—

Years ended 5 Jan.	Gross receipts.	Charges of collection.	Returns.	Net receipts.	Rate per cent. of collection.		
	£	£	£	£	£	*s.*	*d.*
1838	2,462,269	669,940	122,531	1,669,798	27	4	1
1839	2,467,216	669,756	120,938	1,676,522	27	2	11

The Select Committee on Postage, in 1838, instituted the following comparison between the Post-office revenue of the six years ending 5th January, 1838, and that of six years ending 5th January, 1821.

See Appendix to Report I., p. 503.	GROSS REVENUE, Excluding repayments. 1815 to 1820 inclusive.	GROSS REVENUE, Excluding repayments. 1832 to 1837 inclusive.	NET REVENUE, After deducting cost of management. 1815 to 1820 inclusive.	NET REVENUE, After deducting cost of management. 1832 to 1837 inclusive.
	£	£	£	£
	2,273,843	2,175,292	1,598,295	1,531,823
	2,323,835	2,190,181	1,619,196	1,553,425
	2,186,634	2,209,439	1,537,505	1,513,052
	2,099,225	2,243,294	1,433,871	1,564,458
	2,151,213	2,350,603	1,467,533	1,645,835
	2,108,833	2,339,738	1,522,640	1,658,479
Totals of the six years	13,143,583	13,508,547	9,179,040	9,467,077
Average of the six years	2,190,597	2,251,424	1,529,840	1,577,846
Increase at the end of seventeen years	60,827	....	48,006	....
Annual average increase	3,578	....	2,923	....

It thus appeared that on an average gross revenue of 2,190,597*l.* there had been in seventeen years a positive increase of 60,827*l.*, averaging only 3578*l.* yearly, or little more than 1½ per thousand, though the advance had been rapid in population, and still more so in wealth, industry, and trade.

Establishment, Cost of Management, &c.—The head of the Post-office is styled the Postmaster-General, under whose authority are placed all the Post-offices in the United Kingdom and the colonies. The office was jointly held by two persons until the last few years. It is considered a political one, and the holder relinquishes it with a change of ministry; but the postmaster-general has not a seat in the cabinet. The Commissioners of Post-office Inquiry (4th Report) recommended that the office should be exercised by three permanent commissioners; and a bill passed the Commons to give effect to the recommendation, but was thrown out by the Lords. The last return of the force of the establishment was made in 1835, and was as follows:—

Establishment.

1. Postmaster-General.

	London.	Dublin.	Edinburgh
Number of persons employed in secretary's office	17	7	4
Mail-coach office	12	2	
Solicitor	1	1	1
Receiver-general	9	3	Cashier's office 2
Accountant-general	15	7	5
Surveyors	7	3	2
Ship-letter office	8		
Dead-letter office	18	8	3
Foreign office	16		
Inland office	80	32	23
Inspectors of letter-carriers	4	2	1
Messengers	30	8	
General-post letter-carriers	281		
Mail guards	220	82	
Sea-mail guards	8		
Housekeeper, bagmen, watchmen, &c.	23	14	
Twopenny-post	54		
Twopenny-post letter-carriers	464	89	55
Total	1337	258	97
Expenses	£96,234 17 10	£18,394 19 2	£9,735 6

Parl. Paper., No. 442 (1835).

In 1831 and 1832 the chief offices of London, Dublin, and Edinburgh were re-modelled by the duke of Richmond, then postmaster-general. The separate office of postmaster-general for Ireland was abolished, and other changes were made, which were estimated to reduce the expenses above 4700*l.* per annum. In London the saving was estimated at 6448*l.* per annum: a secretary at Dublin and at Edinburgh is chief executive officer for the respective countries.

The metropolitan General Post-office was removed in 1829 from Lombard-street to St. Martin's-le-Grand. It is the head-quarters of all post-office business. All accounts of the collection of the revenue and the expenditure are rendered there.

The number of persons employed in London in the dispatch of general-post letters only in the evening is about 290. In the morning, including newspapers, about 380. In the evening about 180 letter-carriers are employed on newspapers, the nightly average of which is about 50,000. On Saturdays the numbers often exceed 100,000. Constant additions are being made to the number of post-offices throughout the kingdom. At the present time the following, considering posts formerly called penny-posts, 'fifth-clause posts,' and sub-offices as post-offices, may be taken to be about the numbers:—

	Post-Offices.	Sub-Offices.	Penny-posts.	Total.
England .	650	190	1090	1930
Scotland .	220	105	230	555
Ireland .	330	105	200	635

Every post-office in the United Kingdom has direct communication respectively with the chief offices in London, Dublin, and Edinburgh.

The operations of the Post-office belonging to the dispatch of letters before the introduction of Mr. Hill's plan, but which are thereby subjected to some modification, consisted in—1, facing or placing one way all the addresses of the letters and stamping them, to show the date of their receipt; stamping being performed with a hand-stamp at the rate of 200 letters per minute; 2, sorting according to the different mail-routes; 3, examining and taxing the letters with the various charges; 4, re-sorting according to the different post-towns; 5, telling, that is, making out bills for the unpaid letters against the different deputy-postmasters.

The duty of the London General Post-office in the receipt of letters consisted in unloading the mails and delivering the letters, that is to say—1, in opening the bags, of which there are 700, and in checking the deputy-postmasters' accounts for paid letters, one person examining a bag in one minute and a half; 2, sorting into districts; 3, telling, that is, making out bills against every letter-carrier; 4, delivering; the letter-carriers return by a certain time, and pay the money charged against them to the receiver-general.

The Commons' Committee, in 1838, prepared the following analysis of the

Cost of Management for the United Kingdom.

	Total.	In these Three Columns the Items of Cost are classed according to the principle suggested by Mr. Hill, the data being taken from the Post-office Returns, Nos. 41 and 42, pp. 220 and 221, App. Rep. II.		
		Cost of Distribution within the United Kingdom.		Foreign and Colonial Expenses and Superannuation Allowances.
		Cost of Transit.	Cost of Establishment.	
Salaries and Allowances.	£ s. d.	£ s. d.	£ s. d.	£ s. d
Salaries to the Postmaster-General, Officers, and Clerks in London, Edinburgh, and Dublin Offices, and Wages and Allowances to Letter-carriers, Messengers, &c.	98,485 2 2	..	98,485 2 2	
Salaries and Allowances to Deputy-Postmasters and Agents in Great Britain, Ireland, and the Colonies	124,403 3 11	..	110,024 17 11	11,650 17 8[*] 2,726 8 4[†]
Salaries and Wages to Officers and Letter-carriers in the Twopenny Post-office	45,574 10 1	..	45,574 10 1	
Allowances for Special Services and Travelling Charges	11,106 6 7	..	11,106 6 7	
Conveyances of Mails, Transit Charges, and Payment for Ship Letters.				
Riding-work and Expresses by the Deputy-Postmasters in Great Britain and Ireland . .	102,619 12 10	102,619 12 10		
Mileage to Mail Coaches, Wages to Mail Guards, and other Mail Coach Expenses . . .	107,122 8 0	107,122 8 0		
Tolls paid on Mail Coaches	33,863 1 5	33,863 1 5		
Riding-work and conveyance of Mails in Canada, Nova Scotia, and Jamaica	17,081 17 10	..	..	17,081 17 10
Riding-work of the Twopenny Post-office . .	5,198 17 2	5,198 17 2		
Transit Postage through Foreign Countries . .	11,718 15 4	..	..	11,718 15 4
Ship-Letter Payments	10,649 9 9	..	..	10,649 9 9[‡]
Packet Service, Expenses, including Port-dues	62,506 3 0	30,997 12 7	..	6,853 18 9[§] 24,655 11 8[‖]
Tradesmen's Bills, Building and Repairs . .	11,326 19 8	..	11,326 19 8	
Rent of Offices, Tithes, and Taxes . . .	4,143 0 9	..	4,143 0 9	
Law Charges	9,417 4 5	4,000 0 0	5,417 4 5	
Stationary, Printing, Advertising, and Postage .	3,717 7 1	1,717 7 1	2,000 0 0	
Superannuation Allowances, and Allowances for Offices and Fees abolished	20,538 10 3	..	..	20,538 10 3
Other Payments	1,787 12 5	1,787 12 5		
	681,259 2 8	287,306 11 6	288,078 1 7	105,874 9 7
Parliamentary Grants [Net Annual Amount stated in Account of Revenue in Appendix to Report II., p. 177, 9,889*l.*] . . . . . £ s. d. 9,932 10 0 Menai Bridge, Conway Bridge, and Milford Road 7,440 9 6	17,372 19 6	..	287,306 11 6	17,372 19 6
	698,632 2 2	Total Cost of Distribution in United Kingdom . . .	575,384 13 1	123,247 9 1

These accounts show that about four-fifths of the charges consist of the cost of distributing letters in the United Kingdom. Transit costs two-fifths, and the establishment two-fifths. The maintenance of the post between this country and the colonies and foreign countries, the inland post in certain colonies, and other charges, make up the remaining fifth. But these accounts are not altogether complete, because the expense of those packets controlled by the Admiralty is included in the Navy Estimates, and cannot be separated. And as the penny stamp on newspapers was retained as a postage, about 185,000*l.* should be carried to the account of the Post-office receipts. These accounts are of course subject to change yearly. The employment of railroads has added much, since the above analysis was made, to the mileage charges.

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[*] Postmasters in Colonies; see Returns of Expenditure, in Appendix to Second Report of Committee, p. 220.

[†] Other Colonial Expenses; see Return of Expenditure, in Appendix to Second Report, p. 220.

[‡] Stated in Return of Expenditure, in Appendix, p. 220, as 10 693*l.* 7*s.* 10*d.*

[§] Passage-money and freight by the packets; see Appendix to Report II., p. 220.

[‖] Expenses of the Foreign and Colonial Packets; see Appendix to Report II., p. 220.

No accounts of the number of documents passing through the Post-office were kept until very lately. Founded upon a very careful examination of the best data, the numbers were estimated by the Commons' Committee, in 1838, to be as follows:—

Chargeable letters—

General Post, inclusive of foreign letters, and reckoning double and triple letters as single	57,000,000
2*d.* and 3*d.* post letters	12,500,000
Country penny-post letters	8,000,000
	77,500,000
Franks	7,000,000
Newspapers	44,500,000
	129,000,000

A more detailed estimate, the result of very elaborate calculations, is appended to the 'Report of the Commons' Committee' which is here subjoined—

Description of Letters.	Yearly Number of Letters.	Average rate per Letter. *d.*	Yearly Revenue. £.
Packet and ship letters	3,523,572	23·1562	369,340
General Post inland letters above 4*d.*	46,378,800	9·2224	1,782,191
Ditto, not exceeding 4*d.*	5,153,200	3·5	75,151
London local-post letters	11,837,852	2·3266	114,753
Country penny-post letters . . .	8,030,412	1	33,483
Total . .	74,923,836	7·6074	2,374,923
Parliamentary franks	4,813,448	...	...
Official franks, for public purposes .	2,109,010	...	...
Public statutes .	77,542	...	...
Newspapers . .	44,500,000	...	...
Total of documents transmitted by post	126,423,836	...	2,374,923
Unappropriated			4,641
Total revenue from letters, 1837			2,379,564

See Notes to *Postage Report*, pages 4 and 6.

The chargeable letters in the mails leaving London were found to weigh only 7 per cent. of the whole weight of those mails. The total weight of the chargeable letters and franks carried by the thirty-two mails leaving London was only 2912 lbs. Deducting one-half as the weight of the franks and franked documents, the weight of all the chargeable letters was only 1456 lbs., being 224 lbs. less than the weight which a single mail is able to carry. The average weight of the thirty-two mails was found to be as follows:—

Average of 32 Mails.	Pounds weight.	Per centage.
Bags weighed	68	14
Letters, including franked letters and documents	91	20
Newspapers	304	66
	463	100

The management of the conveyance of the mails by sea and land is subject, of course, to those constant changes which arise out of the improvements daily taking place in the various modes of transit. Certain packets are exclusively controlled by the Admiralty, to whose charge they were removed in 1837; others still remain with the Post-office. The Parliamentary Returns and Reports of various Commissioners on the subject of the Packet-Service are numerous. The most important are—'The Twenty-second Report of the Commissioners of Revenue Inquiry,' part 5, printed 1830, and the 'Sixth Report of the Post-office Commissioners on the Packet Establishments,' printed in 1836.

Contracts for the conveyance of the mail-bags to the Continent are made between the Post-office and the proprietors of certain steam-vessels. A contract has lately been entered into with Mr. Cunard at an expense of 60,000*l.* per annum to carry the mails twice a month for eight months and once a month for four months in first class steam-ships between Liverpool and British North America. The passage between Liverpool and Halifax has been performed in ten days. The Post-office moreover has power of sending a bag of letters in any private ship.

The inland correspondence is carried by railroads, by four horse and two-horse coaches; by cars in Ireland, by single-horse carts, on horseback, and foot.

Number of miles travelled over in England and Scotland by the mail-coaches in the following years, was as follows:—

1834 . .	5,911,006	1837 . .	6,643,217
1835 . .	5,931,218	1838 . .	7,204,295
1836 . .	6,233,478	1839 . .	7,377,857

And a Parliamentary Return, printed 1836 (No. 364), presented the following account of the speed and cost of the mail-coaches:—

	England. Miles.	Ireland. Miles.	Scotland Miles.
Greatest speed travelled per hour . . .	10⅝	9½	10½
Slowest, „ „	6	6⅞	7
Average speed „ „	8⅞	8¼	8¼
	Per mile.	Per English mile.	Per mile.
Average mileage for 4-horse mails . .	1⅞*d.*	2⅞*d.*	1⅛*d.*
Ditto for 2-horse do. .	1¾	1¼	2¼

Since this Return, in 1836, was made, the acceleration of the mails by the use of railroads has been nearly doubled, and most of the mail coaches out of London have been superseded by them. At the present time, upwards of a fourth of the whole correspondence of the United Kingdom is carried on the Birmingham Railroad. The mail between London and Edinburgh is now conveyed in thirty hours, partly by railway and partly by coach.

The present system of mail coaches owes its origin to Mr. Palmer. In 1784, Mr. Palmer, who was manager of the Bath and Bristol theatres, laid a plan before Mr. Pitt, which was adopted by the government, after much opposition from the functionaries in the Post-office. The greatest improvement in the transmission of the correspondence of the country was effected by this plan. Mr. Palmer found the post, instead of being the quickest, nearly the slowest conveyance in the country; very considerably slower than the common stage coaches. The average rate of speed did not exceed three miles and a half per hour. Whilst coaches left London in the afternoon and reached Bath on the following morning, the post did not arrive till the second afternoon. Slowness was not the only defect: it was also irregular, and very insecure. The robbery of the mail was very common. Mr. Palmer succeeded in perfecting the mail-coach system, and in greatly increasing the punctuality, the speed, and security of the post. At least 500 places obtained a daily delivery of letters, which before received them not oftener than three times in the week.

The net revenue before these changes had averaged for twenty years about 150,000*l.* a year. In ten years after Mr. Palmer's plan had been in work, the net revenue increased to 400,000*l.*; in twenty years it became 700,000*l.*; and in thirty years it had reached a million and a half, from which sum it can hardly be said to have advanced to the present time. The reader will find both the history and progress of Mr. Palmer's plan, of the Post-office opposition, and the subsequent proceedings arising out of his claims, fully related in Parliamentary Papers, printed by order of the House of Commons in 1807, 1808, and 1813.

Mr. Rowland Hill's plan.—In 1838 a plan calculated not only to increase the utility of the Post-office in the promotion of all the objects of civilization, but to change the whole management of the institution, was brought forward by Mr. Rowland Hill, a gentleman wholly unconnected with the department. It was at first privately submitted to the government, and subsequently published in a pamphlet under the title of 'Post-office Reform—its Importance and Practicability.' In a short period three editions were issued. The main features of Mr. Hill's plan, which, putting aside the merits of the suggestion of a uniform rate, is discussed with singular moderation, acuteness, caution, and sound reasoning, proposed to effect—1, a great diminution in the rates of postage; 2, increased speed in the delivery of letters; and, 3, more frequent opportunities for their dispatch. He proposed that the rate of postage should be uniform, to be charged according to weight, and that the payment should be made in advance. The means of doing so by stamps were not suggested in the first edition of the pamphlet, and Mr. Hill states that this idea did not originate with him. A uniform rate of a penny was to be charged for every letter not exceeding half an ounce in weight, with an additional penny for each additional ounce. Mr. Hill discovered the justice and propriety of a uniform rate in the fact that the cost attendant on the transmission of letters was not measured by the distance they were carried. He showed on indisputable data that the actual cost of conveying letters from London to Edinburgh, when divided among the letters actually carried, did not exceed one penny for thirty-six letters. Independently of its fairness, the obvious advantages of simplicity and economical management were strongly in favour of a uniform rate.

The publication of this plan immediately excited a strong public sympathy in its favour, and especially with the commercial classes of the City of London. Mr. Wallace moved for a select committee to inquire into its merits on the 9th May, 1837; but the motion fell to the ground. On the 30th May, 1837, Lord Ashburton, upon presenting a petition from some of the most eminent merchants, bankers, men of science, and others in the metropolis, to the House of Lords, spoke strongly in favour of the plan. In the December of the same year the government assented to the appointment of a select committee to inquire into and report upon the plan. A society of merchants was forthwith formed in the City of London to furnish evidence of the evils of the high rates of postage, and the insufficiency of the Post-office management in answering the wants of the present times. The subject began to excite much interest throughout the country. In the session of 1837 five petitions were presented to the House of Commons in favour of the plan. In 1838 upwards of 320 were presented, of which number seventy-three emanated from town-councils, and nineteen from chambers of commerce. After sitting upwards of sixty-three days, and examining Mr. Rowland Hill and eighty-three witnesses, besides the officers of the departments of the Post-office and the Excise and Stamps offices, the committee presented a most elaborate Report in favour of the whole plan, confirming by authentic and official data the conclusions which Mr. Hill had formed from very scanty and imperfect materials. The Committee summed up a very long Report as follows:—

'The principal points which appear to your Committee to have been established in evidence are the following:—

'The exceedingly slow advance, and occasionally retrograde movement, of the Post-office revenue during the period of the last twenty years. The fact of the charge of postage exceeding the cost in a manifold proportion. The fact of postage being evaded most extensively by all classes of society, and of correspondence being suppressed, more especially among the middle and working classes of the people, and this in consequence, as all the witnesses, including many of the Post-office authorities, think, of the excessively high scale of taxation. The fact of very injurious effects resulting from this state of things to the commerce and industry of the country, and to the social habits and moral condition of the people The fact, so far as conclusions can be drawn from very imperfect data, that whenever on former occasions large reductions in the rates have been made, those reductions have been followed in short periods of time by an extension of correspondence proportionate to the contraction of the rates.

'And as matter of inference from fact, and of opinion,

'That the only remedies for the evils above stated are, a reduction of the rates, and the establishment of additional deliveries, and more frequent dispatches of letters.

'That owing to the rapid extension of railroads, there is an urgent and daily increasing necessity for making such changes.

'That any moderate reduction in the rates would occasion loss to the revenue, without in any material degree diminishing the present amount of letters irregularly conveyed, or giving rise to the growth of new correspondence.

'That the principle of a low uniform rate is just in itself; and when combined with pre-payment, and collection by means of a stamp, would be exceedingly convenient, and highly satisfactory to the public.'

The appearance of the Committee's Report seemed to inspire the whole country with confidence in the plan. Petitions in its favour amounting to 2000 were presented to both houses of parliament in the session of 1839. The late postmaster-general, the duke of Richmond, advised the government to adopt it; and the chancellor of the exchequer brought forward a bill to enable the Treasury to carry the plan into effect, which was carried by a majority of one hundred in the House of Commons, and passed into law on the 17th August, 1839. In the following month an arrangement was made which secured Mr. Rowland Hill's superintendence of the working out his own measure. On the 5th December, 1839, as a preparatory measure, to accustom the department to the mode of charging by weight, the inland rates were reduced to a uniform charge of 4*d.* per half ounce. The scale of weight for letters advanced at a single rate for each half ounce up to sixteen ounces. Other reductions were made in the packet rates; and the London district post was reduced from 2*d.* and 3*d.* to 1*d.* This measure continued in force until the 10th January, 1840, when a uniform inland rate of postage of 1*d.* per half ounce, payable in advance, or 2*d.* payable on delivery, came into operation. On this day parliamentary franking entirely ceased. On the 6th May stamps were introduced: only three of the proposed forms were ready at this time, the covers, envelopes, and labels. The warrants of the lords of the Treasury which authorised these changes were published in the London Gazette of the 22nd November, 28th December, 1839; 25th April, 1840. The effect of these changes on the revenue cannot at present be accurately shown; but it is estimated that the loss of net revenue on the first year will be above one million. Returns have been made which show the increase of letters to the time we are now writing. The number of letters which were actually counted for the week ending 24th November, 1839, before any changes took place, was 1,585,973 letters, including franks; for the week ending 22nd December, 1839, during the fourpenny rate, it was 2,008,687; and for the week ending 23rd February, 1840, 3,199,637. Thus the number of *chargeable* letters of all kinds increased 29 per cent. under the 4*d.* rate, and 121 per cent. (or, deducting the government letters, 117 per cent.) under the 1*d.* rate. The number of chargeable letters dispatched by the General Post increased 40 per cent. under the 4*d.* rate, and 169 per cent. (or, deducting the government letters, 165 per cent.) under the penny rate.

The following are the returns made to the House of Commons (printed, No. 501) of the number of letters for th whole kingdom since the 23rd February, 1840:—

Week ending	
22 March, 1840	...3,069,496
26 April, „	...2,954,866*
22 May, „	...3,138,035
21 June, „	...3,221,206

POSTING, from the French 'poste,' derived from the Low Latin word 'posta' (Ducange, *in verbo*), is so called from horses being placed at certain stations or posts, where they may be hired by individuals at their pleasure. The application of the words 'post' and 'postmaster' as well to the transmission of letters and the persons to whom this business is entrusted, as to stations where post-horses are kept, and the persons who own or have the care of them, is the cause of much confusion: and it frequently cannot be understood in reference to which branch early writers intend these terms to be applied. The ambiguity is not confined to the English language. Post-horses were first established by the governments on the continent of Europe in the thirteenth and fourteenth centuries for the conveyance of dispatches; they were occasionally employed for the conveyance of persons connected with such governments, and gradually by passengers in general. Posting continues in most countries to be carried on by the state, which retains the monopoly of supplying post-horses, and usually of forwarding mails and diligences: Great Britain and Ireland, and a part of Hungary, are the only exceptions. In the United States and British North America there is at present (1840) no posting, at least in the sense in which the term is commonly used; that is to say, a person cannot have his carriage conveyed in such a direction as he may wish, and hire fresh horses at convenient stages. He must engage an 'extra exclusive' in some principal town, and the same horses must convey him throughout his whole journey, unless another large town should lie on the road. This is the mode of travelling known on the Continent by the name of 'vetturino,' 'voiturier,' or 'Lohnkutscher.' The want of the power of posting is not so inconvenient as might be supposed, for the number of private carriages is not large, and in districts where there is much travelling, communication is usually facilitated by steam-boats, railways, and stage-coaches.

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* Easter holiday week.

In *France* the government conduct all posting, and an authorised book is published fixing the number of horses to be used according to the number of persons to be conveyed and the shape of the carriage. We must refer to this book, in which all the regulations respecting this manner of travelling will be found. The charge for each horse is 15*d.* for a post of five English miles; there is an addition to this charge on entering large towns. The average rate of travelling is from five to six miles an hour.

In *Germany*, posts were first established by the Count de Taxis at his own expense, for which he was rewarded in 1616 by the emperor Matthias, who conferred on him and his successors the office of postmaster, and gave them the exclusive privilege of furnishing horses for the conveyance of letters and passengers throughout his dominions. This privilege is still retained by the descendants of Taxis in some of the small German states. The number of horses used is not at the discretion of the traveller, but, as in France, according to the quantity of persons and luggage to be conveyed and the shape of the carriage. The price is low, some of the government regulations are inconvenient, and the travelling is slow. (Murray's *Handbook for North Germany*, p. 188.)

In *Holland* the posting regulations introduced by the French still remain in force, and are nearly identical with those of France. A Dutch post of somewhat less than five English miles may be travelled with a pair of horses for about 3*s.* 4*d.* English; this sum does not include tolls, which are extremely high in that country. (Murray's *Handbook, North Germany.*)

In *Belgium* posting is under nearly the same regulations as in France: the cost of a pair of horses is about 1*s.* an English mile, post-boy included.

In *Switzerland* posting is confined to certain routes near the frontier. An authority is likely to be given by the diet for the general establishment of post-horses. (Murray's *Handbook for Switzerland.*)

In *Hungary* posting is principally in the hands of government; the cost for a pair of horses a little exceeds 3 florins a post. Between Vienna and Pesth there is likewise an independent posting establishment, the speculation of peasants who drive their own horses, and called 'Bauern (or peasants') post.' It is one-third cheaper, and at least twice as expeditious as the government posting; but travellers must find their own carriages, as post-caleches are not provided by the peasants. (Murray's *Handbook for South Germany*, and Paget's *Hungary*, i. 36.)

In *Italy* posting is found on the principal roads. The price, which is fixed by the respective governments, varies in the different states. It is charged by the post, a measure which is likewise variable. (Starke's *Guide Book*, p. 484.)

In *Spain* post-horses are provided by government on the main roads, but they are seldom used for the conveyance of private carriages on account of the frequent robberies of travellers who have not an escort, or who travel in small companies.

In *Russia* a traveller must obtain a 'Padaroshna,' or order from the governor of the place on all the postmasters on his intended route, enjoining them to supply him with a specified number of horses. The charge made for this order is afterwards deducted from the price paid for the horses. Posting costs from 4*s.* 6*d.* to 6*s.* English for four horses for twelve miles; the drivers get a trifle, a rouble (10*d.*) or half a rouble each for a stage. A traveller should furnish himself with a 'marche route.' There being no book of roads and posts, it is customary to apply to the clerks of the post-office before starting from Petersburg or Moscow, who, for a fee of 10 or 12 roubles, make out a list in Russian and Italian characters of all the posts on the line, with the number of versts between each. The low payment of postmasters by the emperor induces them continually to attempt extortion. The pace travelled is frequently very fast considering the nature of the country. (Bremner's *Russia*, p. 176, vol. ii.)

Posting is very generally established in England, but is now less used in consequence of the introduction of railways. In frequented and populous districts, change of horses may commonly be procured at intervals of from eight to twelve miles, and in the most remote and thinly inhabited at inns not more than from fifteen to twenty miles apart. The cost at which post-horses are bought is ordinarily greater than that of stage-coach horses; they are often employed to draw very heavy weights, and are used for long stages; besides, one at least in each pair must be a saddle as well as a draught horse: the average price of each horse may be stated at 17*l.* The trade is wholly in the hands of private speculators. The rate of travelling with post-horses varies according to the weight of the carriage and the number of horses employed; from eight to nine miles an hour may be stated as the average rate of a pair of horses under ordinary circumstances. The number of horses hired depends solely on the will and discretion of the party hiring, which are controlled by no legal regulation whatsoever. The payment is estimated per mile for each pair of horses, without reference to the number of persons conveyed, and a second pair of horses is charged at the same rate as the first; the payment to the postmaster does not include the driver, who expects a gratuity of about three pence a mile. Four horses is the greatest number ever required for one carriage. Sixteen or eighteen pence per mile is the usual price for each pair of horses, and, when the payment of postboys and turnpikes is added, a journey will be found to cost about twenty-two pence a mile. If a post-chaise or fly be required as well as post-horses, no additional charge is made on account of the carriage. The price of posting is nearly uniform throughout England, but there is considerable variation in the degree of goodness of the horses and chaises provided. On much-frequented roads, where there is generally competition in the posting trade, the accommodation is very superior to what is found at little-frequented inns, where an inferior description of post-horse is kept, which is often insufficiently fed because it is not frequently employed. One of the causes which account for the excess of price paid for posting in England above that on the Continent is the large amount of tax which is levied upon it. 1. A postmaster pays yearly 7*s.* 6*d.* for a licence. 2. For every chaise or four-wheeled carriage, 5*l.* 5*s.*; and for every two-wheeled carriage, 3*l.* 5*s.* annually. 3. Three pence a mile for each pair of horses. The last-mentioned duty is levied in the following manner:—An Excise officer delivers to the postmaster so many printed tickets, some for four horses, some for two, and some for one horse; the postmaster is required, when he sends out his horses, to fill in upon a ticket, on which is stated the number and his name, the date, and the number of miles which the horses are hired to travel: this ticket is left by the postboy at the first turnpike. The excise-officer periodically takes account of these tickets, which are returned to his office by the turnpike-keepers; he also compares them with the number issued to the postmaster, and if the postmaster cannot produce the correct balance which he should have in hand, he is fined 1*s.* for every horse enumerated in the missing tickets. This method of collecting the duty is found preferable to the system of farming to individuals the duties accruing in different districts. Penalties for neglecting to pay these duties are inflicted at the quarter-sessions. The total produce of the post-horse duty for the year 1839 was 237,452*l.* 7*s.* 5*d.*; for 1840 it was 224,405*l.* 15*s.* 11*d.*, showing a decrease of 13,046*l.* 11*s.* 6*d.*

The great superiority of English over foreign posting is a very strong evidence that the system of open competition in this trade is preferable to a government monopoly and control. The establishment of posting by governments no doubt arose originally from the supposition that it would not be generally undertaken by individuals: it has since been carried on by such governments principally for the purpose of raising revenue. We do not believe that good posting can be provided by governments; we are sure that under such circumstances it cannot be as good as public competition would secure. Where posting is a government monopoly, a minimum speed must be fixed for the protection of the public; this speed is usually uniform throughout a whole country, and is not greater in any part of such country than can be attained where circumstances are disadvantageous. It is the interest of the postmaster, who provides the horses, that this speed should not be exceeded, and if the postilion drive very slowly, the traveller has but two remedies; one, to complain to the authorities, which can only be done when the regulation pace is not attained; the other, to bribe the postilion. The latter system has become of such frequent use in most European countries, that bribes are, as it were, a customary payment, they are always expected by the postilion, and are of little service unless they exceed the customary rate of bribing. We think that the monopoly system does not render posting more general, but that in almost every district where it is now provided by governments, there is a sufficient demand to induce individuals to establish relays of horses on all important lines of communication. Under the free system post-horses are found throughout Ireland, where there is neither a rich resident population nor generally such other circumstances as attract travellers from other countries: there is no reason to suppose that there is a greater demand for posting in Ireland than on the continent of Europe generally. In the success of the voluntary system in Hungary, where circumstances must be considered far from favourable to its introduction, we have additional evidence that it might be substituted beneficially and without risk in most if not all the instances where government monopoly is retained. That revenue can be raised on posting, without the government acting as a postmaster, we have England for an example. There appears then to be no just ground for states continuing a monopoly which ensures a bad commodity without returning an adequate benefit.

POSTLETHWAYT, MALACHI, an eminent writer on commerce, is supposed to have been born about the year 1707; but no particulars relative to his origin or education, and very few relative to his after-life, appear to exist. In the introductory discourse to his work, entitled 'Great Britain's True System,' he says, pp. 62, 63, 'Nature having given me but a very tender and weak constitution, I have studiously declined and avoided, as much as I well could, every degree of the public life, as being inconsistent with and indeed destructive of that small share of health which I have several years enjoyed; and it will easily be believed that the studies I have been engaged in have not mended it. I therefore considered in what capacity I might prove useful to society; and accordingly betook myself to the studious life, experiencing that to be more consonant to my preservation than that of the active and public one.' In the previous paragraph he complains of the neglect with which his labours had been rewarded. 'Had the writer of these papers,' he observes, 'given no public or private testimony of his turn to studies that have proved useful to the state, it might be unreasonable, it might have been justly thought presumptive, in such an one to expect to make terms for his future intended services; but as the case is otherwise, he humbly hopes that some people will be candid and ingenuous enough to think that he has a right to be treated upon a footing something different from that of an upstart idle schemist or projector, who has never given proof of any talents that might deserve the public regard and attention.' This was published in 1757. The appeal does not appear to have been responded to either by the government or the public. He died September 13, 1767, suddenly, as he had often wished, and was buried in Old-street churchyard, the coffin, at his request, being filled with unslacked lime.

His other works are:—1, 'Considerations on the Revival of the Royal British Assiento between His Catholic Majesty and the Hon. the S. Sea Company,' 8vo., Lond., 1749; 2, 'The Merchants' Public Counting-house,' 4to., Lond., 1750; 3, 'The Universal Dictionary of Trade and Commerce, translated from the French of Savory, with additions,' &c. 2 vols. fol., Lond., 1751-56, last edition 1774; 4, 'A short State of the Progress of the French Trade and Navigation,' 8vo., Lond., 1756; 5, 'Britain's Commercial Interest explained and improved,' 3 vols. 8vo., Lond., 1757; 6, 'The Importance of the African Expedition considered,' 8vo., Lond., 1758; 7, 'The History of the Public Revenue, from the Revolution in 1688, to Christmas, 1753,' fol., Lond., 1759. This last is by James Postlethwayt, probably the brother of Malachi, though it is attributed to the latter by Watt in his 'Bibliotheca Britannica.'

(An article on 'Political Arithmetic,' in Sir Egerton Bridges's *Censura Literaria*, Lond., 1805, 8vo., vol. i., p. 59, &c.; *Gentleman's Magazine*, vol. 37, p. 479.)

POSTULATE (*postulatum*, *αἴτημα*), a thing required to be granted, or the use of which in reasoning is *demanded.* The distinction between a postulate and an axiom lies in this—that the latter is admitted to be self-evident; while the former may be agreed upon between two reasoners and admitted by both, but not as a proposition which it would be impossible to deny. We have [AXIOM] given our reasons for supposing that Euclid made this distinction, and that several of those propositions which are now written among the axioms were originally postulates. The distinction above made is really necessary; for example, writers on the evidences of Christianity assume the existence and attributes of the Creator as a postulate: they take them for granted. A person who is in the habit of not distinguishing these senses to which the words postulate and axiom have been affixed above, might say they assume the existence and attributes above mentioned as axioms, by which another person might understand things necessarily indisputable; while the writers themselves only mean by the assumption, that what they take for granted has been previously proved by writers on natural theology. The confusion which prevails as to the use of the word axiom would be lessened by the introduction and proper use of the word postulate, which is our reason for adding these few words to what has been said under AXIOM.

PO'STUMUS, a native of Gaul, distinguished himself in the Roman service, and was appointed by Valerianus governor of the Gauls. Under the weak reign of Gallienus he was saluted emperor by the troops in that part of the empire. Postumus ruled Gaul for ten years with great ability and moderation, says Eutropius: he repulsed the Germans, who had invaded the country, and restored peace, but he was at last killed in a mutiny of the soldiers headed by one Lollianus, because he would not allow them to plunder Moguntiacum (Mainz), which had revolted against him. He was succeeded in the command of Gaul by Victorinus, who was killed also two years after. (Eutropius; Trebellius Pollio, *Triginta Tyranni*, in 'Historia Augusta.')

Coin of Postumus.

British Museum. Actual size.

PO'SYDON, a genus of crustaceans, established by Fabricius, which M. Desmarest thinks should be placed near to *Albunea.*

POT-METAL, an alloy of lead and copper used for the purpose expressed by its name.

POTADO'MA, Mr. Swainson's name for a subgenus of fluviatile shells, genus *Melania*, subfamily *Melanianæ*, family *Turbidæ*. Mr. Swainson defines the form as having the general characters of *Melania*, but the outer lip hardly dilated, and the top of the inner lip internally thickened. He adds his suspicions that the true distinction of this second type of *Melania* will rest on the deciduous nature of the spire.

PO'TAMIS, a genus of fresh-water shells resembling *Cerithium* in the aperture, but differing from that genus by the possession of a thick horny epidermis. Mr. G. B. Sowerby, jun. thinks that it should be placed near *Melania* (*Manual.*)

Mr. Swainson makes *Potomis*, Brong. (*Potamis*), the first genus of his subfamily *Cerithinæ*, with the following character:—

Fluviatile, covered with a brown epidemis; whorls coronated and armed with spines; aperture almost entire, the notch being slightly developed; top of the outer lip with an obsolete sinus. Example, *Potamis muricata*.

Pirena immediately follows this genus in Mr. Swainson's arrangement.

PO'TAMO. [ECLECTICS.]

POTAMO'BIA, Dr. Leach's name for a genus of crustaceans allied to *Thelphusa.*

POTAMOMY'A, a genus of fresh-water shells bearing a resemblance to *Corbula*, and, in the opinion of Mr. G. B. Sowerby, jun., probably belonging to the *Myariæ*.

PO'TAMON, Savigny's name for a genus of crustaceans allied to *Thelphusa.*

POTAMO'PHILA, Sowerby's name for a genus of fluviatile conchifers.

Generic Character. — Shell thick, equivalve, inequilateral, trigonal, covered with a greenish brown, smooth, horny epidermis; hinge thickened, broad, with one central notched cardinal tooth in one valve, and two in the other, lateral teeth indistinct; ligament large, supported on prominent fulcra; muscular impressions two in each valve, suborbicular. (Sowerby.)

This is the *Venus subviridis* of some authors, *Galathæa* of Lamarck, previously used by him to designate a genus of crustaceans, and *Megadesma* of Bowdich, which last name Mr. G. B. Sowerby, jun. considers to have the right of priority. (*Manual.*)

Mr. Swainson adopts Bowdich's name, and places the genus under the subfamily *Cyclinæ*, family *Tellinidæ*.

POTAMO'PHILUS, Latreille's name for a genus of crustaceans allied to *Thelphusa*, if not identical with it. Indeed M. Desmarest thinks that *Potamon* and *Potamobia* differ but little, if at all, from *Thelphusa*.

POTASH. [POTASSIUM.]

POTA'SSIUM, a metal, the base of the alkali potash, in which it exists combined with oxygen. It was discovered by Sir H. Davy in the year 1807. He obtained it by subjecting caustic potash (hydrate of potash), slightly moistened to increase the conducting power, to the opposite poles of a powerful voltaic battery: by the decomposing agency of the electricity, he found that the oxygen both of the water and the potash was elicited at the positive pole, while the hydrogen of the water and the potassium of the potash appeared at the negative pole.

This process yields however very small quantities of potassium; and Gay-Lussac and Thénard shortly afterwards invented an apparatus by which a much more abundant supply was procured. For the details of this method we refer to the first volume of the 'Recherches Physico-Chemiques' of the chemists mentioned. The process consists essentially in bringing fused hydrate of potash into contact with iron turnings heated in a gun-barrel; at this high temperature the iron not only decomposes the water and combines with its oxygen, but it takes oxygen also from the potash, and the potassium set at liberty sublimes, and is collected in a cool part of the apparatus. Various improvements have since been made, and especially by MM. Brunner and Wöhler, the former of whom procured the metal by heating potash with iron and charcoal, and the latter by means of charcoal alone: in this case the accompanying products are chiefly either carbonic acid or oxide of carbon, or a mixture of these gases.

The properties of potassium are the following:—in colour and lustre it strongly resembles mercury; it is solid at the usual temperature of the air; at 50° it is soft and malleable, and yields like wax to moderate pressure, and at 32° it becomes brittle; at 70° it is somewhat fluid, but not perfectly so till the temperature reaches 150°; if heated to low redness, out of the contact of the air, it sublimes, and condenses on cooling, unchanged. Its texture when brittle is crystalline. Its specific gravity at 60° is 0·865; it is opaque, and a good conductor of heat and electricity.

The most remarkable chemical property of potassium is its great affinity for oxygen, which at common temperatures exceeds that of any other body for this elementary substance. It tarnishes rapidly and visibly by mere exposure to the air, and the more rapidly as the air contains moisture, which it decomposes, and by combining with its oxygen becomes oxide of potassium, or potash.

On account indeed of its powerful affinity for oxygen, it must be kept either in small glass tubes hermetically sealed, or in a fluid, such as naphtha, which contains no oxygen; when heated in the air it takes fire, burns with a purple flame, the evolution of much heat, and is converted either into potash or peroxide of potash, or a mixture of them. It takes the oxygen from any mixture of gases containing it, and indeed from almost every substance with which that element happens to be combined, so that when thrown upon water, it decomposes it with violent ignition, and the hydrogen of the decomposed water, combining with a little potassium, rapid combustion takes place, the principal products of it being water and oxide of potassium, or potash, which remains in solution. When, on the other hand, the potassium is put under an inverted tube containing water, no combustion takes place, if no air be admitted, and the results are hydrogen gas and potash.

All the elementary gaseous bodies unite with potassium, forming compounds of the highest importance and utility in many respects. We shall first describe the compounds of

Oxygen and Potassium: these form two compounds, protoxide and peroxide of potassium; the first has been known and extensively used from time immemorial, and is the substance formerly called the vegetable alkali, or potash, or more correctly hydrate of potash, and is now frequently called potassa; the peroxide has been known only since the discovery of potassium. Pure or anhydrous potash is obtained by the slow oxidation of potassium in dry air or dry oxygen gas; for if water be present, then the hydrate is formed. Its properties are that it is white, solid, extremely caustic, and readily attracts moisture and carbonic acid from the air; it fuses when heated, but bears a high temperature without being volatilized or decomposed. It combines readily with water, much heat being evolved during the combination, and its affinity for acids is extremely powerful; the aqueous solution possesses the properties termed alkaline in a high degree, such as reddening vegetable yellow colours, and restoring the blue colour of vegetables which has been reddened by an acid; it is the basis of all the oxisalts of potassium.

Potash, or protoxide of potassium, is composed of

One equivalent of oxygen . .	8
One equivalent of potassium . .	40
Equivalent .	48

This substance exists in some minerals, but in the largest quantity in Felspar [FELSPAR], of which it constitutes on an average at least ten per cent., existing in it in the state of silicate or combined with silica. Potash, as is well known, is extensively employed in the chemical arts and also in medicine, and for these purposes it is obtained by the incineration of wood, the ashes of which yield a considerable portion of this alkali. What is known in commerce by the name of potash is principally hydrate of potash, but mixed with some carbonate of potash and impurities; while the pearl-ash of commerce is principally carbonate of potash: they are both very largely imported, and chiefly from North America.

Hydrate of Potash is formed whenever an aqueous solution of potash is evaporated to dryness. If, for example, we throw a piece of potassium on water, and examine the solution after the combustion is over, it is found to contain potash; and if this solution be evaporated to dryness, the residue is not absolute potash, as was once supposed to be the case, but is a chemical compound of water and potash, from which no degree of heat is able to expel the water, but they may be volatilized in combination at a very high temperature. The usual method of obtaining hydrate of potash is to treat an aqueous solution of carbonate of potash (pearlash) with lime; this takes the carbonic acid, carbonate of lime is formed, and remains insoluble, while the potash dissolves, and the solution being evaporated, hydrate of potash, frequently called merely potash, is left.

The properties of hydrate of potash are, that it is white, hard and brittle, extremely caustic, very deliquescent, and very soluble both in water and in alcohol; by evaporating the aqueous solution, crystals are obtained containing much water. During solution in water a considerable degree of heat is evolved: the solution is colourless, and though inodorous, has a strong caustic disagreeable taste; it destroys the cuticle, and acts strongly on vegetable yellows; by acids, for which the alkali has great affinity, it is converted into various salts of great importance in science, medicine, and the arts. Potash is largely employed in glass-making, more especially flint-glass, in making soft-soap, and in the processes of calico-printing and many other chemical arts, and as a caustic in surgery.

Hydrate of potash is composed of—

One equivalent of water . .	9
One equivalent of potash . .	48
Equivalent . .	57

Peroxide of Potassium may be obtained by burning the metal in dry oxygen gas; an orange-coloured substance results, which is the peroxide in question. It is also procured when oxygen gas is passed over red-hot potash, and in small quantity when the hydrate is heated to redness in the air. This substance is not applied to any purpose whatever, and when merely put into water it is decomposed into oxygen gas, which escapes in small bubbles, and protoxide of potassium, or potash, which remains in solution: on account of this extreme facility of decomposition, it does not combine with any acids to form salts.

Peroxide of potassium consists of—

Three equivalents of oxygen	24
One equivalent of potassium	40
Equivalent	64

Azote and Potassium do not combine.

Hydrogen and Potassium form two compounds, but the composition of neither of them is known. When hydrate of potash is decomposed by iron at a white heat, a gaseous hydruret of potassium is procured, which burns spontaneously in oxygen gas or the air which contains it; the same compound is probably also produced when water is decomposed by the action of potassium upon it. When this gas is allowed to remain over mercury, the greater part and probably the whole of the potassium is deposited in a few hours. When potassium is heated in hydrogen gas, a solid grey hydruret of potassium is formed, which does not burn spontaneously like the gaseous compound in oxygen gas, but is readily decomposed by heat or the addition of water.

Chlorine and Potassium unite to form only one compound; its present name is chloride of potassium, but it was formerly called the febrifuge salt of Sylvius, and afterwards muriate of potash. It may be obtained in several ways: when the metal is put into the gas, spontaneous combustion ensues, and a white inodorous compound is obtained, which has a taste greatly resembling that of common salt; when also potassium is heated in hydrochloric-acid gas, hydrogen gas is evolved, and the chloride of the metal formed; and lastly, when potash is dissolved in a solution of hydrochloric acid, and the solution is evaporated, cubic crystals of this salt are formed, which are colourless, inodorous, saline, and rather bitter to the taste; it is soluble in about three times its weight of water at 60°, and more so in hot water; in alcohol it is insoluble. It was formerly employed in medicine, but is not at present; it is sometimes produced in chemical operations as a residue, and is then used in alum-making. It yields by analysis—

One equivalent of chlorine	36
One equivalent of potassium	40
Equivalent	76

Fluorine and Potassium combine to form the fluoride. This salt is procured by mixing the aqueous solutions of hydrofluoric acid and potash; by their mutual decomposition a solution of fluoride of potassium results, which, when the solution is properly evaporated, yields cubic crystals; they are colourless, deliquescent, have a sharp saline taste, and dissolve readily in water.

This salt is composed of—

One equivalent of fluorine	18
One equivalent of potassium	40
Equivalent	58

Bromine and Potassium combine by direct action, or by the action of the bromine upon a solution of potash; in this last method a mixture of bromide of potassium and bromate of potash is procured, which, by evaporation to dryness, and subjecting it to a red heat, is totally converted into bromide. It is most commonly prepared by first forming a bromide of iron, and decomposing that salt with potash. These yield by double decomposition the bromide in question, which remains in solution, and hydrate of iron, which is precipitated.

By evaporating the solution, cubic crystals of bromide of potassium are procured; which are colourless and inodorous, have a very penetrating taste, are very soluble in water, and most so when it is hot. By heat this salt suffers igneous fusion, but is not decomposed. It is decomposed by chlorine, which evolves bromine; this salt is sometimes employed in medicine, and is constituted of—

One equivalent of bromine	78
One equivalent of potassium	40
Equivalent	118

Carbon and Potassium have been supposed to combine, but it is questionable, and the compound has not, at any rate, been procured in a pure state.

Sulphur and Potassium probably combine to form five different compounds; the union takes place readily when these elements are heated together, and the nature of the compounds depends upon the relative quantities of the ingredients employed.

We shall describe only the protosulphuret, or that consisting of—

One equivalent of sulphur	16
One equivalent of potassium	40
Equivalent	56

This may be obtained by decomposing sulphate of potash at a red heat by hydrogen or charcoal. Its properties are that it has a red colour, has a disagreeable alkaline and sulphurous taste, is alkaline to test-papers, deliquesces on exposure to the air, and is soluble both in water and in alcohol. Most acids decompose it, and during their action much hydrosulphuric acid gas is evolved; it is also decomposed when added to solutions of the different metals in acids, the colour of the precipitated sulphuret depending upon the nature of the metal. This substance, mixed with some sulphate of potash, is occasionally used in medicine in cutaneous disorders.

Phosphorus and Potassium and *Selenium and Potassium* form compounds, but they are not of importance.

Iodine and Potassium may be made to combine, so as to form the iodide of the metal, by dissolving the iodine in a solution of the alkali; but the residue obtained by evaporation requires heating to convert the iodate of potash, which is also formed, into iodide of potassium. It is usually procured by decomposing a solution of iodide of iron by means of potash; the solution separated from the precipitated hydrate of iron is colourless, and by evaporation yields colourless and cubic crystals. The properties of this salt are, that it has a penetrating taste; it is very soluble in water, but absolute alcohol dissolves it sparingly; at a red heat it fuses, and at a very high temperature it is volatilized without suffering decomposition.

It is used in medicine to a very considerable extent, and is composed of—

One equivalent of iodine	126
One equivalent of potassium	40
Equivalent	166

Cyanogen and Potassium combine. When carbonate of potash is heated, with twice its weight of dried blood or other animal matter, to redness, and the residue, when cold, is washed with water, a mixture of carbonate of potash and cyanide of potassium is dissolved, which, when precipitated with acetate of lime, filtered, and mixed with alcohol, yields a precipitate, which is cyanide of potassium.

This salt is very soluble in water, and when once procured in the solid state, it should be kept from the contact of air and water. It may be fused by heat without decomposing; its taste is pungent and alkaline, accompanied with a flavour of hydrocyanic acid, and the smell of this acid is perceptible when it is exposed to the air, the carbonic acid of which causes its expulsion; by the action of acids it is resolved into hydrocyanic acid, which is expelled, and potash, which unites with the acid. It is sometimes employed in the preparation of hydrocyanic acid.

It is composed of—

One equivalent of cyanogen	26
One equivalent of potassium	40
Equivalent	66

Cyanide of Potassium combines with iron to form a well-known and extensively employed salt, the

Ferrocyanide of Potassium, sometimes called *Prussiate of Potash*, or the *triple Prussiate of Potash*. This salt is obtained by indirect chemical action. When animal matter, as hoofs or horns or blood, is heated in an iron vessel with potash, a compound is obtained, which consists principally of cyanogen, iron, and potassium. This is very soluble in water, and the solution by evaporation yields large crystals of a fine yellow colour, and the primary form appears to be a cube. This salt is inodorous; its taste is rather saline; water at 60° dissolves about one-third, and at 212° its own weight of this salt; it is insoluble in alcohol; when moderately heated it loses about 13 per cent. of water, and becomes colourless. When heated to redness with access of air, it suffers partial decomposition: the residue when put into water leaves oxide of iron, and cyanide of potassium is formed; and this is the best method of obtaining this salt. When the heat is long continued, the salt is entirely decomposed, ammonia is formed and evolved, and a mixture of carbonate of potash and peroxide of iron remains.

When this salt is added to a solution of a persalt of iron, that beautiful pigment Prussian blue is formed, and it precipitates most metals from their solutions in acids. This salt is also and very largely used in preparing hydrocyanic acid, which it readily yields when heated in a retort with sulphuric acid.

It is composed of—

One equivalent of cyanide of iron	54
Two equivalents of cyanide of potassium	132
Three equivalents of water . .	27
Equivalent . .	213

Salts of Oxide of Potassium, or Oxisalts of Potassium.

Potash Salts.—Potash has powerful affinity for most acids: the salts which they form are never prepared, as many metallic salts are, from the direct action of the acid and metal, and but seldom indeed from the immediate combination of the alkaline oxide, or potash, with acids. Some of the most important salts are found native, and others are very commonly the result of chemical operations performed with the intention of preparing other products at the same time.

The first salt of potash which we shall mention is one of the highest importance: it is the

Nitrate of Potash, Nitre, or Saltpetre.—It is quite true that this salt may be artificially formed by adding either the metal or its oxide, potash, to nitric acid; but it is never so obtained, being in some countries formed by the putrefaction of animal matters, in others it is a natural product, and to a very great extent, and as such is largely imported from the East Indies under the name of rough nitre, where it is obtained by the lixiviation of certain soils: in Germany and France it is artificially produced in what are termed nitre-beds. M. Thénard has given a detailed account of the French process, in his 'Traité de Chimie.'

The properties of nitrate of potash are, that it is colourless, inodorous, has a cooling sharp saline taste, and is readily soluble both in cold and in hot water: from the latter prismatic crystals separate on cooling, the primary form of which is a right rhombic prism; but they are usually six-sided prisms, with dihedral summits: when obtained from a large quantity of solution, the crystals are of very considerable size. The crystals contain no combined water, but it is commonly mechanically lodged between their laminæ. At about 616° of Fahr. nitre fuses, and at a high temperature it suffers decomposition; and the residue, according to the degree or continuation of the heat, is either hyponitrite of potash, potash, or a mixture of potash and peroxide of potassium. Nitre occasions much cold during its rapid solution in water, so that an ounce of it is capable of reducing five times its weight of water fifteen degrees. Nitre possesses powerful antiseptic properties. It is largely employed in the manufacture of gunpowder and of nitric acid, and also in numerous processes in the chemical arts and manufactures.

It consists of—

One equivalent of nitric acid . .	54
One equivalent of potash . .	48
Equivalent . .	102

Chlorate of Potash.—This salt is entirely an artificial one. It is prepared by passing chlorine gas into a solution of potash: during their mutual action there are formed chlorate of potash and chloride of potassium; and the chlorate, being the less soluble of the two, crystallizes first. This salt is colourless, inodorous, and has a cooling austere taste. The primary form of the crystal is an oblique rhombic prism. The crystal contains no water. It is soluble in eighteen parts of cold and two and a half parts of boiling water. When triturated, it appears phosphorescent; and if heated to redness, it fuses, gives out nearly 40 per cent. of very pure oxygen gas, derived both from the decomposition of the acid and the potash, and mere chloride of potassium remains. When triturated with certain inflammable bodies, as sulphur and phosphorus, combustion or explosion, or both, are produced: these effects are produced by the oxygen of the decomposed chloric acid.

This salt is also decomposed by sulphuric acid, giving out oxide of chlorine. [Chlorine.] In 1788 an attempt was made in France to use this salt, instead of nitrate of potash, in the manufacture of gunpowder; but when the mixture was triturated, so violent an explosion occurred as to kill several people.

It is constituted of—

One equivalent of chloric acid . .	76
One equivalent of potash . . .	48
Equivalent . .	124

Chlorate of potash is employed in chemical investigations on account of the purity of the oxygen gas which it yields; it is also employed in the manufacture of matches which are fired by means of friction. When this salt is mixed with sugar, or metallic arsenic, or antimony, a drop of sulphuric acid will set the whole in rapid combustion.

Carbonate of Potash.—This salt is known in its impure state by the name of *pearlash:* it is rendered pure by solution, filtration, and evaporation to dryness, it being a salt which does not readily crystallize.

Pearlash, as already mentioned, is procured by the incineration of wood: when treated with a small quantity of water, but little except the pure carbonate of potash is dissolved. The solution, when evaporated till it becomes a granular solid, has the following properties:—it is colourless and inodorous, its taste is strong and disagreeable, it does not readily crystallize, and is never kept in crystals; it is deliquescent, attracting in a short time enough water from the atmosphere to become fluid: water dissolves rather more than equal weight of this salt; it is insoluble in alcohol; the aqueous solution has the alkaline property of turning vegetable yellow colours reddish-brown, and hence it was formerly called subcarbonate of potash; but it is in fact a neutral carbonate, consisting of—

One equivalent of carbonic acid . .	22
One equivalent of potash . . .	48
Equivalent . .	70

But, as usually prepared, it is a sesquihydrate, and contains about 16 per cent. of water, which it loses by exposure to a red heat, and becomes anhydrous. This salt may be artificially prepared by passing carbonic acid gas into a solution of potash, or by deflagrating a mixture of charcoal and nitre: in this case the charcoal is converted into carbonic acid at the expense of the oxygen of the decomposed nitric acid.

This salt is largely employed in the arts, and also in medicine; it is decomposed by most acids, with effervescence of carbonic acid gas: it is also decomposed by lime and by barytes, which separate its carbonic acid, but without effervescence: no degree of heat is sufficient to expel its carbonic acid.

Bicarbonate of Potash.—When carbonic acid gas is passed into a solution of carbonate of potash, the salt combines with an equivalent of carbonic acid, and becomes a bicarbonate. This salt is inodorous, colourless, and crystalline; has scarcely any alkaline taste, and acts feebly upon turmeric paper: the primary form is a right oblique-angled prism. It is not altered by exposure to the air, requires four times its weight of cold water for solution, and by boiling water it is partially decomposed, with the evolution of carbonic acid gas: in alcohol it is insoluble. When exposed to a red heat, it loses half its carbonic acid, and reverts to the state of a neutral carbonate.

Bicarbonate of potash consists of—

Two equivalents of carbonic acid . .	44
One equivalent of potash . . .	48
One equivalent of water . . .	9
Equivalent . .	101

It is largely employed in medicine and in chemical investigations.

Sulphate of Potash is an artificial salt: it is seldom prepared by the direct combination of its constituents, but is readily obtained by the addition of the acid either to potash or the carbonate. It is formed largely in the preparation of sulphuric acid and also of nitric acid by adding sulphuric acid to nitrate of potash: by dissolving the residue in water, and saturating the solution with potash, the sulphate is obtained, which possesses the following properties:—it is colourless, inodorous, bitter, and rather hard; water at 60° dissolves only one-sixteenth of its weight, but boiling water a much larger quantity; it is insoluble in alcohol, and suffers no change by exposure to the air: when subjected to a red heat, it decrepitates, losing but little weight, for it contains no water of crystallization. The primary form of the crystal is a right rhombic prism, but it has often the appearance of a dodecahedron, consisting of two six-sided pyramids applied base to base.

It yields by analysis—

One equivalent of sulphuric acid	40
One equivalent of potash	48
Equivalent	88

It is now little employed in medicine; but it is used in the manufacture of alum, and as a residue is often decomposed and converted into carbonate of potash.

Bisulphate of Potash is produced during some of the processes employed for obtaining nitric acid from nitre, as when two equivalents of the acid are used with one equivalent of the salt: the properties of this salt are, that it is colourless and inodorous, but extremely sour and bitter; it is very soluble in water; the solution reddens vegetable blues very strongly, and decomposes carbonates with effervescence. When exposed to a red heat, it loses all the water of crystallization and half the acid, and becomes neutral sulphate of potash.

The primary form of the crystal is a right rhombic prism, which is frequently very flat.

It contains—

Two equivalents of sulphuric acid	80
One equivalent of potash	48
Two equivalents of water	18
Equivalent	146

This salt sometimes crystallizes with only one equivalent of water, and it is then in fine filamentous crystals.

It is a little, and but little, employed in medicine; the rough salt is employed in some chemical manufactures under the name of *sal enixum.*

Sesquisulphate of Potash has been occasionally formed: it is in fine slender crystals.

There are two salts of potash, consisting of the alkali combined with vegetable acids, which it will be proper to mention, and with which we shall close this account of the salts of potash, premising that there are several other important compounds for an account of which we must refer to chemical authorities.

Bitartrate of Potash, Cream of Tartar, or *Tartar.*—This salt is obtained by the purification of argol, which is the name of the impure salt deposited from wine. Bitartrate of potash is colourless, rather hard, inodorous, and has a sour taste; when dissolved in water it reddens litmus paper; it requires sixty parts of cold and fifteen parts of boiling water for solution; by long exposure to the air the dissolved salt is decomposed and converted into carbonate of potash, and the same effect is immediately produced by a red heat. The residue, put into water, leaves charcoal, and the carbonate of potash is dissolved.

The primary form of the crystal of this salt is a right rhombic prism.

It consists of—

Two equivalents of tartaric acid	132
One equivalent of potash	48
One equivalent of water	9
Equivalent	189

It is very largely employed in the preparation of tartaric acid, in medicine, and some chemical arts. When an equivalent of potash is added to this salt, it becomes *neutral tartrate of potash:* this salt is used in medicine, and being much more soluble in water than the bitartrate, was formerly called *soluble tartar.*

Oxalic Acid forms three different compounds with potash, the oxalate, quadroxalate, and binoxalate; this last is a natural product obtained from sorrel, and is commonly known by the name of salt of sorrel. It is a colourless crystalline salt, has a sour bitterish taste, and is soluble in about ten parts of water.

It is composed of—

Two equivalents of oxalic acid	72
One equivalent of potash	48
Equivalent	120

General properties of the Salts of Potash.—These are stated by Mr. Brande to be nearly as follows:—They are soluble in water, and afford no precipitates with the alkalis or their carbonates. They produce a precipitate in the solution of chloride of platina. They are not changed by ferrocyanide of potassium or hydrosulphuric acid. Added to sulphate of alumina, they occasion it to crystallize, the crystals being common alum: a strong solution of tartaric acid added to a strong solution of potash, causes no precipitation till the point of neutralization is exceeded; but then a crystalline precipitate of bitartrate of potash is formed, on account of the slight solubility of this salt, which redissolves when excess of potash is added to it. Tartaric acid also occasions precipitation in solutions of the neutral salts of potash, as the nitrate, sulphate, and chlorate.

POTASSIUM, or POTASSA, *Medical Properties of.* The preparations of potash which are used in medicine are very numerous; but they may be reduced and spoken of under a very few heads:—first, those which are employed from their causticity to produce counter-irritation, or to open abscesses: these are hydrate of potash (potassa fusa) and potash with lime (potassa cum calce), which have been already treated of. [ESCHAROTICS.] Second, those which are employed to counteract acidity, viz. liquor potassæ, carbonate and bicarbonate of potash, the causticity of which last two is diminished in proportion to the increase of the carbonic acid combined with the alkali. Thirdly, those which possess a purgative property, such as the sulphate and bisulphate of potash, the tartrate and bitartrate. Fourthly, those possessed of a diuretic property, such as the acetate, and, when in small doses, the nitrate and chlorate of potash. Besides these, there are the sulphuret of potash, the bromide of potassium, and iodide of potassium, which possess special and characteristic qualities, which prevent their being classed with any of the preceding.

The various uses of which these numerous preparations are susceptible can only be explained in medical treatises: all that is proper here is to caution individuals against the employment of those which counteract acidity. These are extensively had recourse to, either in a simple state or as ingredients in effervescing mixtures, for the cooling effect they produce, or designedly to remove superfluous acid in the stomach. Where much debility exists, and more particularly if the phosphatic diathesis, or disposition to the deposit of the phosphates from the urine, be present, a single dose of such articles may do much injury, and their frequent or prolonged use creates a worse condition than that which they were intended to remedy. An intelligent medical attendant can alone decide on their propriety. 'If I were required,' says Dr. Prout, 'to name the medicine calculated to do the most mischief, I should name the common saline draught formed of potash or soda and some vegetable acid.' (*Treatise on Diseases of the Urinary Organs,* 2nd edition, p. 145.) [CARBONIC ACID.]

The property assigned to bromide of potassium, of removing enlargements of the spleen, is by no means clearly proved. The powers of iodide of potassium have been noticed under IODINE, and those of the sulphuret of potassium are treated of under SULPHUR. In case of poisoning by liquor potassæ or the carbonates, vegetable acids or oils should be instantly administered.

POTATO (*Solanum tuberosum,* Lin.). The circumstances which led to the introduction of this valuable vegetable into the system of British husbandry may be thus succinctly stated:—

Queen Elizabeth, in 1584, granted a patent 'for discovering and planting new countries not possessed by Christians;' and under this sanction some ships, principally equipped by Sir Walter Raleigh, sailed with him to America. Thomas Harriott (afterwards known as a mathematician), who accompanied the adventurous squadron, transmitted to England the description of a plant called *Openawk* by the natives of that part of North Amerca, which the courtier-like gallantry of Raleigh had named Virginia.

Harriott described the *Openawk* as having the roots round, and 'hanging together as if fixed on ropes, and good for food, either boiled or roasted.' Gerarde, in his 'Herbal,' a few years subsequently, distinguished the plant by a plate; and not only confirmed the assertion that it was an indigenous production of Virginia, whence he himself had obtained it, but supplied some curious details of its qualities, and of the various modes in which it may be dressed for the table. He especially recommended it as the basis of 'delicate conserves and restorative sweetmeats,' with the assurance that its flatulent effects may be infallibly corrected by having the roots 'eaten sopped in wine;' adding, 'to give them the greater grace in eating, that they should be boiled with prunes.'

The honour of first cultivating the potato in Ireland, where it has so long constituted the principal food of the peasantry, has been attributed to the grandfather of Sir Robert Southwell, president of the Royal Society of London, towards the close of the seventeenth century. Sir Robert's statement was to the effect that his ancestor had obtained some roots from Sir Walter Raleigh. The well-known story of Raleigh's having first planted the potato in his garden at Youghal, and of the disappointment of the gardener in autumn on tasting the apples of the 'fine American fruit,' and of his subsequent discovery of the tubers, when he was desired by his master to throw out 'the useless weeds,' is probably authentic also.

But the potato had been known in Spain and Portugal at an earlier period, and it is from the latter country that we most directly derive the name by which we know it: this is easily shown. Although the natives of North America called our plant openawk, those of the south, more particularly the inhabitants of the mountains of Quito, called it papas, which the Spaniards corrupted into battata: this again their neighbours in Portugal softened into ba-ta-ta (da terra), to which po-ta-to is a very close approximation.

The potato was cultivated in Ireland long before its introduction into Lancashire, which was owing to a shipwreck, it is said, at North Meols, at the mouth of the Ribble, where the mode of propagation still maintains pre-eminence, and whence the culture of this important plant has gradually spread through every portion of Great Britain.

It was not however until after a considerable time that it became palatable, productive, and farinaceous, or admitted into the course of field husbandry. It was limited to the garden for at least a century and a half after it was first planted at Youghal, and it was not until 1732 cultivated as a field crop in Scotland. It appears (from the 'General Report of Scotland') that in the year 1725-6 the few potato plants then existing in gardens about Edinburgh were left in the same spot of ground from year to year, as recommended by Evelyn: a few tubers were perhaps removed for use in the autumn, and the parent plants were well covered with litter, to save them from the winter's frost.

A strange objection to potatoes was urged by the Puritans, who denied the lawfulness of eating them, because they are not mentioned in the Bible; but whether we view this vegetable with reference to its adaptation to every soil and almost every climate, or as a great source of food and nutritive properties, it must be ranked among the best gifts of Providence.

Though the plant may be propagated both by its seed and tubers, practical management has confined the cultivation to the latter mode, except for the purpose of raising new varieties or renewing old ones. Those who are curious about varieties (which are now innumerable), can almost indefinitely pursue their object; for the seed of a species, the red apple for example, will sport, and this too without hybridising (that is, without the admixture of its seed with that of any other species, the produce of which would be hybrids) into numberless varieties of form and colour—round, flat, oblong, red, pink, black, white, mixed, and purple, of every shade and colour. These, whether hybrids or not, are reproduced through successive seasons by the tubers alone, if they possess those qualities which render them desirable for continued cultivation, on account of peculiar adaptation to early or late seasons, size, predominance of farina, &c.[*]

This mode of propagation by tubers either improves those qualities or gradually develops objectionable properties. Some varieties are therefore permanently established, while the culture of others is either abandoned, or, if continued, it is known that those varieties revert in the course of a few generations to the nature of their parent kind, and therefore cease to constitute a variety.

In the vegetable kingdom, hybrid plants have not the power of propagation by seed; but they can be rendered reproductive by budding and grafting, or by means of cuttings, slips, and tubers, and an original stock comparatively worthless may be highly improved by such modes of multiplication. But when a farmer possesses two or three kinds of decided excellence, he will act wisely by not encumbering his stores with too many varieties, which always occasion trouble and confusion in the field management.

In order to obtain seed, properly so called, the apple, when perfectly ripe, should be dried, and then disengaged from its seed by rubbing with the hand. The seed should be preserved in a dry place, in paper or cloth bags, until the middle of March or beginning of April, when it may be sown in wooden boxes or earthen pans, with a covering of less than half an inch of well pulverised earth. The vessels ought then to be placed in hotbeds of mild heat, such as is suited to the raising of half-hardy annuals. The plants, when an inch high, should be pricked out into other vessels, and placed in a temperature somewhat lower than before, to inure them to the external air, to which they should be exposed after frosts have ceased. These plants should be put out in drills sixteen inches apart, and with the interval of six inches between the plants in the rows. They will produce tubers in the first year, and these may be planted in the following season in the ordinary way.

For very early crops, such as those which the ash-leaved and walnut-leaved kinds in particular yield, the most successful treatment was that practised by the late Mr. Knight, president of the London Horticultural Society, from the course of whose practice we give the following details of instruction:—Drills may be formed in a warm and sheltered situation (and in the direction of north and south) during any of the winter months, two feet apart, and seven or eight inches deep. Stable dung, half decomposed, should be laid in the drills and combined with the earth four inches downwards, and covered with some of the mould, which had been thrown out in forming the drills, by the rake, to within four inches of the surface. The sets uncut are then to be placed, with the crown eye uppermost, in the centre of the furrow, four inches from each other, and to be covered with only an inch of mould at first, and afterwards with an occasional quantity of sifted ashes, until the plants are so vigorous and advanced as to require the usual earthing, of which however very little is necessary. Mr. Knight used leaves as a lining at the sides of the drills in the early periods, to preserve as much warmth as possible, and better to guard against the effects of frost.

This management alone will be found successful, except perhaps in very tenacious clay soil, in which the rains of winter may lodge so near the fibres of the plants as to destroy them altogether; but destruction from this cause may easily be avoided by increasing the original depth of the furrows and loosening the bed of clay below with the spade to such a depth as will allow the water to descend from the surface, with a drain to carry it off altogether; or by laying below some absorbent matter, such as ashes, chalk, or calcareous gravel.

The germination of the sets may be accelerated by a little management previously to their being planted, by laying them on a floor, sprinkling them with water until they bud, and then covering them with finely-sifted mould. If this be done in December or early in January, the sets, with strong shoots, may be taken up in February (with as much earth as possible adhering to them), and carefully placed in the drills prepared as directed, and covered with well-rotted leaves or earth in the same way.

To market-gardeners it is a great object to raise the earliest potatoes, considering the high price which they obtain for them, though in their waxy state they are neither wholesome nor palatable. Next in early maturity to the ash-leaved and walnut-leaved are the early Manly and early Champion and Fox's seedling.

The best soil for potatoes generally is that which is altogether fresh from the state of ley, or which has not long been broken up: land which has been in grass for only two or three years is easily prepared for the principal crop. It should be as deeply ploughed as possible before winter, and early in March harrowed, and thoroughly cross-ploughed. After lying in this state for two or three weeks, it should again be well harrowed and very deeply ploughed twice, without bringing up any bad substratum, and it will then be fit for the reception of the crop.

The most approved modes of setting are as follows:—Drills should be formed in the well-pulverised field, with double boutings of the plough, in order to have the shoulders uniform, which is essential to the correctness of succeeding operations. The dung is then to be carted out, and divided by the carter with a drag-fork as his horse and cart move forwards (the horse walking in the centre of three drills while the wheels move in the other two), in such quantities as can be most conveniently shaken out into the drills by the labourers employed to spread it. In dry weather the carting does no injury, and this method is universal in Scotland. The other principal mode, more generally pursued in Ireland by some of the best cultivators of the potato, is to cart out the manure before the drills are formed, in rows seven or eight yards apart, and to supply the drills from the heaps as the plough advances in its work, reserving just as much as is supposed sufficient for the concluding drills, which are to be made in the sections of the field previously occupied by the rows of manure. By the latter treatment the manure may be laid over the sets—which cannot be done in the former case—and this will preserve them from being displaced or crushed by the feet of the horses during the process of covering the seed. But against this advantage—which is not inconsiderable—there is the inconvenience of calculating with precision and laying aside as the plough advances to draw the last drills—where the rows had stood—the precise complement of manure, and the difficulty to the ploughman of preserving the exact breadth in those drills.

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[*] M Sargeret, a distinguished and accurate French experimentalist, referred to in the 'Dictionnaire d'Agriculture,' found that out of 300 varieties he had not one exactly like the original from which they were raised; and out of this great number he only found three worth perpetuating.

Some avoid any perplexities in those respects by ploughing in the manure thoroughly before drilling, and either dropping the set in every third furrow, or rolling the whole manured and ploughed surface, and then making drills. Our own experience is greatly in favour of this latter mode, when the fertilising matter is abundant and of the short description which freely combines with the soil and does not obstruct the plough in the subsequent drilling. The lazy-bed method is so generally condemned that any explanation of it here would be superfluous, yet in undrained bog-land, or under any circumstances in which a redundancy of wetness is probable in the autumn, as on low marshy lands, or stiff clay soils which have no sufficient inclination to carry off the water, and are likely to be saturated with moisture in winter from want of drainage, the lazy-bed system is by far the safest. The deep wide furrows at each side carry off the water, or at least remove it from the potato. Thousands of tons of potatoes in the last year (1839) were utterly lost in Ireland, being drilled in flat and tenacious lands, which would have escaped destruction from the continued rains of that season if drained by the furrow of the lazy-bed. Besides, where circumstances preclude the practicability of deep ploughing, the lazy-bed practice repeated for three years will completely spade-trench the entire land, and thus effect an important benefit not otherwise attainable by the humble tiller of the soil who has no teams for ploughing it effectually. Thus local or national modes, though apparently defective to the superficial observer, are sometimes founded upon sound principles, and though we feel disposed to exclude the minute details of what is only defensible under peculiar circumstances from an essay on potato culture under our modern system, we protest against the unqualified condemnation of a method which is still pursued throughout nearly one half of Ireland.

The sets (uncut, for reasons to be yet assigned) are next to be laid down, either under or over the manure, at the average distance of sixteen inches, by the setters, who move in a retrograde direction, and are provided with aprons to contain the sets. A sufficient number of men is in attendance to divide the manure evenly in the drills; the plough also is in the field in order that there may be the least possible exposure of the manure and sets to the sun or to parching wind, but the plough should cover the sets rather lightly in clay soil.

The roller is next used to lay an even surface to the brairding* plants and to facilitate the subsequent progress of the paring plough, which is to be set to work when the stems are six or seven inches high, and should move as close to the plants as is practicable without injuring their tender fibres. The weeders should then hoe the plants carefully, and immediately afterwards (for the influence of wind or hot air on the roots is pernicious) the scuffler or drill-harrow is to follow, in order to clean and level the intervals, before the earthing plough, with either double or single mouldboard, is introduced to apply fresh earth to the stems.

Such is the method of earthing universally pursued by the farmer in Ireland and Scotland, but in England the hand-hoe is principally used for destroying weeds, loosening the earth, and moulding the plants; for the two first of these operations the bean-hoe (which cuts about six inches deep) is used, and the turnip-hoe for drawing the earth to the stems. One man will hoe out the weeds and loosen the soil of half an acre per day, and the subsequent earthing of the same quantity is also executed by one man. This is far cheaper than horse-work, and it does no injury to any of the stems, and makes no waste land at the headriggs; and where the earth has been perfectly well prepared at the commencement, this manual husbandry is the best.

If this system be found most effectual in England, where the wages of a labourer are 2*s.* a day, it must be far more so in Ireland, where they are but half that amount, and where practice would soon give sufficient dexterity in the use of the hoe.

As to the distance between the drills, due regard must be had to the natural quality of the soil and the quantity and description of manure available, or in other words, to the probable luxuriance of foliage. Mr. Knight, aware of the necessity of allowing room in proportion to the vigour and height of the plants, has laid down an exact rule thus:—'the height of the stems being three feet, the rows ought to be four feet apart:' but for a general average, thirty inches is the best distance. As to excess of foliage, we are certain that it is not desirable, for the produce of tubers is not always in proportion to the degree of foliage; under high and rank stems there is often a very scanty crop, and Mr. Knight is justified by experience in his observation that 'the largest produce will be obtained from varieties of rather early habits and rather low stature, there being in very tall plants much time lost in conveying the nutriment from the soil to the leaves,' and consequently strong and upright stems, which do not fall down and shade the others, are those which are desirable.

Two more earthings are usually given, but it is questionable whether even one be necessary in soil of average depth, unless there be a very wide interval between the drills, and it is certain that much earthing in dry and shallow soil is injurious; for by withdrawing the earth from contiguity to the fibres which ramify and penetrate far in loose soil, and laying it on the head of the drill, and in the high ridgelet form, it is applied where it is useless for the nourishment of the tubers, and in a position that favours the rapid escape of moisture, which in such soil it ought to be an object to retain. In deep land, more particularly if it be of tenacious quality, the furrows at each side of the drill will be in general seasons most serviceable as drains, as well as for furnishing earth to support the stems, while the moisture will be sufficiently retained for the roots.

Experiments* have led to the inference that in soil of a loose porous quality there is probably a greater produce by not affording any (or a very slight) moulding, but by digging instead, between the rows; for deep and perfect pulverization, next to an adequate allowance of rich manure, is the main cause of a large produce. In proportion to the deficiency of manure will be the necessity for opening the soil beneath, to allow the fibres, which may be distinctly traced to a depth incredible to those who have not followed their ramifications, to extract all the nourishment which the subsoil may afford. If there be abundance of nutriment above, neither the necessity nor perhaps the inclination for penetrating deeply can exist, and in such cases the operation of earthing by the plough, as long as it can be introduced without injury to the stems, may be useful in many ways, but unquestionably by guarding them from the effects of storm in exposed, and from excessive wetness in low situations. Besides, in regulating this point, regard should always be had to the quality of the potato, for the tubers of some varieties have a tendency to push to the surface, while others tend into the earth, and therefore require a different treatment.

But in all cases the earth should be rendered as loose and friable as possible, by spade, hoe,† or plough, and where labour is easily commanded, the spade will be found to be the more efficacious implement in the first course of treatment after the plants are well up.

Some plant one or two sets in the centre of every square yard, but in such cases great and continued earthing, until each square presents the form of a pyramid, is contemplated; and if our preceding remarks be correct, this treatment is only applicable to deep and retentive soils. Great returns have no doubt been thus obtained, but by this mode there is the least possible incorporation of the manure with the soil.

In minute husbandry, such as that exemplified in labourers' allotments, which excludes the plough altogether, the ordinary and best practice is to lay the sets in rows, after a very deep winter digging, marked with a garden-line. The workman digs precisely as in a garden-plot for cabbages: he clears a little drill, lays the sets straight, puts a sufficiency of manure over them, and then covers from the next spit, which he digs with a spade or a three-pronged fork flattened at the ends, levelling and pulverising as he advances to the distance at which he again puts down his line and forms a new drill. Thus the entire piece is thoroughly loosened, the manure perfectly covered, and every facility given for the hand-hoeing in due course.

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* A Scotch term, signifying 'shooting out.'

* See Martin Doyle's 'Cyclopædia of Practical Husbandry,' page 372.

† That kind called the bean-hoe, shaped like an adze.

The next stage of the potato is that in which it blossoms. It has been recommended to pluck off the flowers. Excessive blossoming is no doubt injurious, but experience has generally proved that the extra cost is hardly defrayed by the additional produce obtained. If the flowers are plucked off, they should be nipped in the early bud.

When the crop is fully ripe, which is indicated by the withering of the stalks, and when the land is free from stones, labourers, in the proportion of about twenty to one plough (half of these being usually men, and the remainder women or young persons), should be set to pull up the stalks, and carefully collect the tubers which may be attached to them, before the plough proceeds in its operation. When it is prepared for work, the men, with prongs flattened at the extremity, are placed at such distances from each other as will give them proper time to fork out the potatoes cleanly for the pickers, who are also stationed at exact distances with a basket between every pair, into which they gather the potatoes.

The common swing-plough may be employed in three ways:—First, in taking off a slice from each side of every drill, and leaving it to the workmen to open out the centre with their prongs; or in its third movement it may turn up this centre, under which the main body of the tubers lie, which is more expeditiously and easily done if the earth be in fit condition. Second, a double mould-board plough with a long sack, and divested of its coulter, may be drawn by two strong horses through the centre of the drills, and completely under the level of the tubers, so as to avoid injuring them, by which means the work-people will be kept exceedingly busy; and if the land be in good friable order, this is the most expeditious mode, and provided there is a perfect harrowing afterwards, the crop will be taken out with sufficient cleanliness. Third, the crop may be taken up by prongs or long narrow spades without the plough. In wet weather this more tedious but far safer method is frequently adopted, and if the drills be short and the headriggs under crop also, it is the most desirable, effectual, and economical mode. In removing the produce in this manner, it is obvious that the number of gatherers should be much less in proportion to the men, than under the other circumstances. The headriggs should evidently be the first parts of the field cleared, to make a free space for the ploughs in the boutings and for the carts.

One horse will answer for three carts if the distance of draught to the pits be short, by changing him alternately from an empty to a full one, but this only applies to the Scotch and Irish system of draught by single carts and horses. The general mode of securing the crop in pits in the field is the safest. In making the pits—improperly so termed, for the base is only sunk a few inches, and the potatoes are raised considerably in the heaps—the only caution to be observed is that furrows should be cut on all sides to prevent water from lodging or penetrating inwards, and that the earth thrown up and over them to the depth of four or five inches, should be well beaten with spade or shovel to exclude moisture and frost. The potato-stalks, however apparently dry, should never be laid between the potatoes and the earth in these accumulations, for they soon ferment and rot, and injure all the potatoes in contact with them. Straw is at least useless. The length of the pit depends on circumstances, but the breadth should not exceed four feet, as large accumulations are most liable to fermentations.

The only decided disease of the potato, besides the dry rot, is 'the curl,' which is an imperfect formation, and was first generally observed in 1764, when it gave rise to various conjectures and unprofitable discussions: the cause is yet unknown. One thing however is clear, that from a crop of which any part is intended for seed, all the plants affected with curl should be carefully separated before the general removal commences. The dry rot, or decay of the set, which during recent years so fearfully prevailed in many parts of the United Kingdom, is also still unexplained as to its real cause, though the press has teemed with essays and very plausible theories respecting it. The same malady was remarked for many years, as appears by the 'Philosophical Transactions of the Bath Society,' and we have reason to think, in seasons similar to those which we have experienced in latter years. The set, though apparently sound when planted, has either failed to germinate at all and rotted away, or has feebly and partially thrown out its sickly shoots. The most contradictory causes have been assigned: over-ripening in the preceding year; under-ripening; fermentation in the pits; fermentation of the set in the ground when placed in contact with hot dung (which is utterly absurd, for when in the ground no injurious fermentation can arise); very hot weather, great drought, hot sun, cold parching wind, dry and heating manure, sea-ware, which is always damp; exhaustion of the kind from a long course of culture, contradicted by many instances in which it appears that the produce of the same variety—for instance the apple—has been successively cultivated during sixty-five years without any failure; or the loss of vitality from prematurely shooting.

If potatoes have fermented in their accumulated state, they would bear obvious evidence of it and therefore be rejected. Fermentation cannot be the true cause in every or even the majority of cases, nor does the failure probably proceed from insects in the eyes, as has been suggested, for if so, it is difficult to account for the fact that sets from the same heap planted at one part of the day have totally failed, while others put into the ground at another have pushed forth healthy shoots. As to decay in the land from the contiguity of fermenting manure, 'how is it to be proved that the gases evolved by fermenting manure can injure the sets? fermenting manures would rather stimulate by their warmth, and excite their growth by the aliment which their essential qualities, carbon and ammonia, supply to plants. Why do not the gaseous exhalations from rank and fermenting hot-beds destroy the tender plants which are raised in them?' (Doyle's *Cyclopædia of Practical Husbandry.*)

The same causes which are severally assigned for the total or partial failure of the potato in numberless instances, and to a most distressing extent in Ireland, have existed since the culture of the potato commenced, but without the effects deplored, which have only prevailed within a very recent space of time. But from the frequent and searching investigation of the subject by the most competent and practical men, a preventive against the failure has been ascertained, namely, the planting of entire tubers. When the cut sets have failed, the entire tubers have resisted premature decay; whether it arises from atmospheric influence or debility of constitution, or from any of the conjectured causes, the entire tubers resist these noxious influences, and germinate healthily and freely. All reports agree on this point; there is no risk in this case, if the tubers be sound when planted; and it may be added, that in all stages of their growth, the uncut tubers maintain a decided superiority and yield a corresponding produce.

The farina of the potato, properly granulated and dried, is sold in our shops as tapioca, to which it bears the closest resemblance both in appearance and essential properties. For confectionary the flour is so delicately white, and it is so digestible and nutritious, that it ought to be in more general use, among the children of the poor especially, in the winter season, when they so rarely enjoy the luxury of milk; and the cost is not more than a sixth or seventh of the price of tapioca or arrow-root, if it be made at home. Few housewives are ignorant of the method of obtaining it by the use of a common hand-grater and sieve; but for yielding larger supplies some machinery is necessary.

POTEMKI'N GREGORY ALEXANDROVITZ, PRINCE, born near Smolensk, of a noble though poor family, entered the army at the age of eighteen, and obtained a cornetcy in the Russian guards. When the Revolution took place at Petersburg, in 1762, by which Peter III. was dethroned, and his wife Catharina proclaimed empress of all the Russias, Potemkin took the part of Catharina, and was very active in bringing his regiment over to her cause. He was duly noticed by Catharina, and after some time he became her favourite. But he had better claims to favour than mere personal attractions, for he had great natural abilities, comprehensive ideas, and great presence of mind: the empress conceived a real esteem for him, which survived the loss of her affection. Unlike her other favourites, Potemkin, when no longer her personal favourite, continued to be the confidential minister and trusty adviser of his sovereign, and was for many years the most influential man in Russia. His views were turned towards the south, and he encouraged Catharina to extend her dominions in the direction of Turkey. He was a main promoter of the war against the Porte in 1771-2, in which the Crimea and Kuban were dismembered from the Ottoman empire, and by which Russia acquired a footing on the coast of the Euxine. He was afterwards the means of inducing Heraclius, czar or prince of Georgia, to do homage to the empress, and receive a Russian garrison at Tiflis. He also induced Solomon, the sultan of Imiretia, to do the same. Lastly, he took advantage of a dispute with the khan of the Crimea, who had been acknowledged as an independent sovereign, to reduce that fine province under the subjection of Russia, in the years 1784-5. The countries dismembered from the Ottoman empire were formed into a Russian government, which received the classical name of Tauris, or Taurida, and Catharina bestowed upon Potemkin, for his services, both military and diplomatic, the surname of Taurisschesky. Conformably to this name, the magnificent palace which Catharina had built for him at Petersburg was styled the Taurian or Taurida palace. In 1787, war having broken out again between the Porte and Russia, Potemkin was made commander-in-chief of the Russian armies, with several experienced generals under his orders, among whom was Suwarrow. In 1788, Oczakow was taken by the Russians, and Ismael in the following year. The Russians occupied Moldavia, Bessarabia, Wallachia, and part of Bulgaria. In 1791, Potemkin left the army, and returned to Petersburg to enjoy his triumphs. He gave a magnificent entertainment to the empress and her court in the Taurida palace, which is well described by Tooke and the other historians of Catharina. It was a gorgeous display, worthy of the Eastern fairy tales. The empress, contrary to her custom, stayed till midnight, in order not to disturb the pleasure of her host and of the company. As she was going to retire, she turned to Potemkin to express her satisfaction, when the prince fell on his knee, and seized her hand, which he bedewed with tears. This was a burst of genuine feeling, and in a man who had long appeared a stranger to such emotions. Shortly after, Potemkin quitted Petersburg to return to the army. He attended the congress of Jassy in 1792, but the negotiations had already begun, and were carried on between Prince Repnin and the grand-vizier. Potemkin fell ill at Jassy of an epidemic which was raging at that time. When Catharina heard of it, she sent two of her first physicians to attend on him; but he would pay no attention to their advice, and indulged even more than usual in his intemperate manner of living. His disease gaining ground, he thought of removing from Jassy to Nicolaieff, a town which he had built at the confluence of the Yekol with the Bog, but he had scarcely travelled ten miles when he felt himself dying. He was taken out of his carriage, and laid down on the grass by the road side, under a tree, where he expired in the arms of his niece the Princess Branicka, in October, 1792, at 52 years of age. His remains were moved to Kherson, where a mausoleum was raised to him by order of Catharina. The following is a list of his titles and offices at the time of his death:—he was field-marshal of Russia, chief general of the cavalry, great-admiral of the Euxine and Caspian seas, governor-general of Taurida and Ekatarinoslaf, master of the ordnance, inspector-general of the army, grand-hetman of the Cossacs, adjutant-general and chamberlain to the empress, colonel of several regiments, and knight of many orders.

Potemkin was a man of contradictions and eccentricities; of great natural abilities, vast conceptions, and of extensive though not deep information. He had a most active mind, with an indolent habit of body. Enthusiastic in his youth, he lived to be satiated with every kind of excitement, and weary of all that this world can afford. He served however to the last his country and his sovereign with zeal, and he was the means of establishing the power of Russia on the coasts of the Euxine. His character was peculiarly Russian, and both his faults and his good qualities were national.

POTENTILLA (so called from its potency in medicine, some of the species, especially *P. reptans*, having been employed as astringents) is a large rosaceous genus, the species of which inhabit exclusively the cooler parts of the world, and prefer the coldest. Most of them are herbaceous perennials, a very few only forming shrubs. Their flowers are usually yellow, in a few species they are white, and very rarely they are purple. Many of the species are cultivated on account of their ornamental appearance. As a genus Potentilla differs from Fragraria (or the strawberry) in nothing except the receptacle of its fruit being dry and hard, instead of succulent and much enlarged. Such of the species of Potentilla as have fingered leaves are popularly called cinquefoils.

POTERIOCRINI'TES. [ENCRINITES, vol. IX., p. 391.] N.B. In Mr. Murchison's great work on the *Silurian System*, vol. ii., p. 672, pl. 17, fig. 3, Professor Phillips describes and figures a new genus of Encrinites under the name of *Hypanthocrinites*, observing that in it the lowest plates clearly seen appear to correspond to the first costals of the genus *Actinocrinites*, and that the pelvic plates were probably small. The column he thinks was probably short; its joints are prominent in the middle, and thinnest near the body. The Professor observes, in conclusion, that the arrangement of the lower plates in *Eucalyptocrinites* of Goldfuss is so very similar to that above noticed, that it is difficult to suppose the genera so entirely distinct as would be the case if *Eucalyptocrinites* be really, as Goldfuss supposes, destitute of a column. Quære tamen.

POTHIE'R, ROBERT JOSEPH, born at Orleans in 1699, studied in his native town, and adopted the profession of the law. He was made conseiller au chatelêt (court) of Orleans, and was afterwards appointed professor of French law in the university of that city. He was an intimate friend of the chancellor D'Aguesseau, and he is considered one of the most distinguished civilians that France has produced. Pothier wrote many professional works, but he chiefly devoted his labours to extend the study of the Roman law. With this view he published his edition of the 'Digesta,' which is entitled 'Pandectæ Justinianeæ in Novum Ordinem Digestæ; cum Legibus Codicis et Novellis quæ Jus Pandectarum confirmant, explicant, aut abrogant,' 3 vols., fol., Paris, 1748-52. The work contains an introduction on the history of the Roman law, a Commentary on the laws of the Twelve Tables and on Hadrian's perpetual Edict, and is accompanied by notes and tables of contents. After Pothier's death, his friend Guyot published a new edition of his 'Pandects,' in which he inserted many corrections and additions that Pothier had made in MS. on a copy of the former edition, and also a biographical notice of Pothier, 3 vols. fol., Lyon, 1782. Other editions of Pothier's 'Pandects' have since appeared; among which there is one with a French translation by Bréard Neuville and Moreau de Montalin, Paris, 1810.

Pothier was the author of numerous treatises on various branches of law: 'Traité du Contrat de Mariage;' 'Traité des Contrats Aléatoires;' 'Du Contrat de Vente;' 'Du Contrat de Change et Billets de Commerce;' 'Du Contrat de Louage;' 'Du Contrat de Louage Maritime et du Contrat de Société;' 'Traité des Obligations,' which has been translated into English, with the following title, 'A Treatise on the Law of Obligations or Contracts, translated from the French by W. D. Evans,' 2 vols. 8vo., London, 1806; 'Traité du Domaine de Propriété, de la Possession, et de la Prescription.' These and other treatises of Pothier have been collected in one work under the title 'Traités sur Différentes Matières de Droit Civil appliquées à l'Usage du Barreau et de la Jurisprudence Française,' 4 vols. 4to., Orléans, 1781.

The compilers of the new French Civil Code under Napoleon made great use of Pothier's treatises, as is shown in a useful work by M. Ledru, a French civilian, entitled 'Le Pothier des Notaires, ou Abrégé de ses divers Traités, avec l'Indication de ceux des Articles du Code Civil dont on y retrouve les Dispositions,' 4 vols. 8vo., Paris, 1823. On this subject Savigny remarks, 'It is generally known that Pothier is the polar star of Roman law to modern French jurists, and that his writings had a most immediate influence on the code. I am very far from depreciating Pothier: on the contrary, the jurisprudence of a nation, in which he was one of many, would be very well directed. But a juristical literature, in which he stands alone, and is honoured and studied almost as an original authority, is an object of pity.' (*Vom Beruf*, &c., p. 60.) The treatise on Contracts, which is perhaps the best known of Pothier's works to English lawyers, may be comprehended within the same judgment. It is a respectable and useful work, but it should not be studied as an authority. Among the other works of Pothier is the 'Coutûme d'Orléans,' 1760, which is one of the most complete treatises on the old French law.

Pothier died at Orleans in 1772. He left many works in MS. which were published by his friend Guyot: 'Œuvres Posthumes de R. J. Pothier,' 3 vols. 4to., Paris, 1777, containing, among others, treatises 'Des Successions,' 'Des Donations Testamentaires,' 'Des Donations entre Vifs,' 'Des Cens,' 'Des Fiefs,' 'De la Procédure Civile et de la Procédure Criminelle.'

It is a merit of Pothier that his learning was enlightened by a strong sense of justice, morality, and religion. He never gave his sanction to any of the unjust and cruel practices of the old French judiciary system, such as the torture. In his treatise 'De la Procédure Criminelle,' sect. iv., art. 2, he exposes the absurd custom which existed in his time in France, and still exists in some European states, of obliging the accused, at the beginning of his interrogation or examination, to take an oath to reveal all the truth, thus inducing him to perjure himself in order to save his life: 'a custom,' observes Pothier, 'which has been reprobated by many divines and moralists, and which appears to be borrowed from the code of the Inquisition.'

POTIDÆA. [MACEDONIA.]

POTO'MAC. [MARYLAND; VIRGINIA.]

POTO'MIDA, Mr. Swainson's name for a subgenus of Dr. Turton's genus *Mysca*, placed by Mr. Swainson in the subfamily *Unioninæ*, family *Unionidæ*. (*Malacology*.)

POTOROO'. [MARSUPIALIA, vol. xiv., p. 462.]

POTOSI', a town in South America, in the republic of Bolivia, and in the department of Potosi, is built on the south-western declivity of the Cerro de Potosi, in 19° 36′ S. lat. and 65° 20′ W. long., at an elevation of 13,265 feet above the level of the sea. This town, which a hundred years ago, when the mines of the Cerro were in a flourishing state, is said to have contained 100,000 inhabitants, contained, in 1826, a population not exceeding 12,000, about half of whom were Peruvian Indians. It is built on an uneven site, and the streets are consequently irregular, but they are tolerably wide and clean. Many of the houses are large, and most of them substantial. On one side of the principal square stands the government-house, a long low range of buildings, including the courts of justice, the gaol, and the guard-house. Opposite to it is the cathedral, an immense edifice, still unfinished, which has very little claim to architectural beauty. The mint also is very large, but far from being a fine building. The great square contains a monument erected in honour of Bolivar. The town is well supplied with meat, fruits, and vegetables, though the surrounding country is barren and exhibits few signs of vegetation. The Indians live mostly on potatoes. The climate of Potosi presents the changes of the four seasons of the year every day. It commonly freezes at night, and the morning is piercingly cold; the forenoon is like the finest March day in England; from noon to about two or three o'clock it is extremely hot in the sun, but in the shade it is not only cool, but very cold. The evenings and the early part of the nights are usually serene, and sometimes mild. It is a healthy place, but the extreme rarity of the air, in consequence of the great elevation above the sea-level, produces a difficulty of respiration called *zarochi*, to which even the natives and animals are subject.

The Cerro of Potosi rises to the elevation of 16,037 feet above the sea. It is of a reddish brown colour, and has the shape of a perfect cone, but is not volcanic, as has been supposed. It does not produce a blade of grass: the whole mountain seems to consist of silver-ore of different degrees of richness. It was discovered that this mountain contained silver-ore by an Indian, in 1545, who being in pursuit of a lama upon the steep declivity, in order to save himself from falling caught hold of a shrub, which being torn from the soil, exposed a mass of solid silver at the roots. From that time to the present day the mines have been worked. The produce of these mines from 1556 to 1800 amounted to the enormous sum of 823,950,508 Spanish dollars, or 185,388,864*l*. The greatest produce was in 1593, when it amounted to 7,858,893 Spanish dollars, or 1,768,251*l*. In the middle of the seventeenth century the produce began gradually to fall off. A few years previous to the War of Independence the produce was still about 8000 marcs (4000 pounds avoirdupois) of pure silver weekly, but during the war the extensive machinery was destroyed, and in 1826 Temple estimated the annual produce at 125,000*l*. only, or 1500 marcs weekly.

(Humboldt, *Essai sur la Nouvelle Espagne*; Temple, *Travels in various Parts of Peru*.

POTOSI, SAN LUIS DE. [MEXICAN STATES.]

POTSDAM is one of the two governments which form the province of Brandenburg. It includes the district of Berlin, which, though only 29 square miles in extent, has been called a government by Hassel and others. This government is situated between 51° 50′ and 53° 35′ N. lat. and between 11° 10′ and 14° 24′ E. long. It is bounded on the north by Mecklenburg-Schwerin and M.-Strelitz, on the north-east by Pomerania, on the east by Frankfort, on the south by Saxony, on the south-west by Anhalt-Dessau, on the west by the province of Saxony, and on the north-west by Hanover. It is formed of the districts formerly called the Priegnitz, the Uckermark, and several circles of the Middle Mark, and is divided into thirteen circles, besides the district of Berlin. The area is 8000 square miles, and the population (1837) 1,169,706; that of Berlin is 265,394. This tract is an extensive and low plain, varied only occasionally by slight elevations. The soil, though for the most part a light sand, contains some fertile spots, especially on the banks of the rivers. The climate is generally healthy. The principal mineral is bog-iron ore, which however does not yield above 20 per cent. The inhabitants are industrious, and carry on manufactures of woollen, cotton, and linen. The principal towns, besides Berlin and Potsdam, are Brandenburg, with 13,283 inhabitants; Prenzlau, with 10,508 inhabitants; Charlottenburg, 6376 inhabitants; New Ruppin, 7415 inhabitants; Wittstock, 6113 inhabitants; and Spandau, 6753 inhabitants.

POTSDAM, the capital of the government, the handsomest town in the Prussian dominions, next to Berlin, is situated at the confluence of the Ruthe and the Havel, on an island about 18 miles in circumference, formed by the Havel, some small lakes, and a canal. It became the occasional residence of the court about the end of the seventeenth century, but it is indebted for its chief improvements to Frederic II., before whose time the old town consisted of only four streets. Frederic built almost the whole of the new town, and had several of the new streets made to look like rows of palaces, the fronts being all of stone. The streets are regular and broad, and there are some good squares; but the whole is on too large a scale for the population, and in the absence of the court, or when the garrison is reduced, the town seems deserted. It is surrounded by a rampart, and has nine gates, of which the Brandenburg gate is a handsome triumphal arch copied from the arch of Trajan at Rome. Of the seven bridges over the Havel and the canal, the finest is the Teltow bridge, which is 600 feet long and 30 wide, and consists of 8 iron arches resting on massive stone pillars. Of the numerous fine buildings the following seem to be the most worthy of notice:—1. The Royal Palace, in the old town, was begun by the elector Frederic William I., and completed by Frederic II. It is an oblong parallelogram, three stories high, adorned with colonnades of the Corinthian order. The main entrance is towards the old market-place, a handsome square, in the middle of which there is an obelisk of red and white marble 75 feet high, the four sides of which are adorned with busts of the elector Frederic William and of kings Frederic I., Frederic William I., and Frederic II. This palace has extensive gardens along the river. 2. The Town-hall, which Frederic II. caused to be built in 1754, on the model of that of Amsterdam. 3. The Theatre. 4. The new great poor-house and infirmary; and 5, the Military Orphan Asylum. Of the churches, we may notice the garrison church, which contains the tombs of Frederic William I. and Frederic II.; the church of the Holy Ghost, with a fine steeple 280 feet high; and the French Protestant church, built on the plan of the Pantheon at Rome. There are extensive barracks, and a large building 660 feet in length and 75 feet in breadth, for exercising the troops in bad weather. Potsdam is the seat of the government, and of all the offices connected with it, and has a great number of useful and charitable institutions. The principal manufactures are silk, cotton, linen, woollens, leather, hats, hosiery, musical instruments, and carriages. In the manufactory of small arms, the musket-barrels, made at Spandau, are fitted with stocks, &c., and finished for use.

In the vicinity of Potsdam are the Brauhausberg with agreeable promenades; the Pfaueninsel (Island of Peacocks) in the river Havel, which is 2000 paces long and 500 broad, with fine grounds laid out in what the Germans call the English style, and containing many foreign animals; the Russian colony Alexandrewna, established in 1826; and three royal palaces: (1) Sansouci, the favourite residence of Frederic II., which is only one story high, with a circular pavilion at each end, in one of which the king's library remains exactly in the same state as at his death. The palace stands on the slope of an eminence and commands a fine prospect. The gardens are very extensive, and laid out with much taste. (2) The Marble Palace; and (3) the New Palace, a very magnificent building founded by Frederic II. The population of Potsdam on the 1st of January, 1838, was 25,560, without the garrison, which varies from 6000 to 10,000 men.

(Dieterici, *Uebersicht des Verkehrs im Preussischen Staate*, &c., 1838; Hörschelman: Cannabich; Stein; Müller, *Geograph. Wörterbuch des Preussischen Staates*, 1836; Heidemann, *Topographisch-Statistisches Wörterbuch der Preussischen Monarchie*, 1836; Schlieben, *Gemälde der Preussischen Monarchie*, 1830; Official Population Returns for 1837.)

POTT, PERCIVALL, was born in London in 1713. He was intended for the Church, in which, under the patronage of his relation the bishop of Rochester, he had good prospects of preferment; but nothing could induce him to give up his inclination for surgery. He was accordingly, in 1729, apprenticed to Mr. Nourse, one of the surgeons of St. Bartholomew's Hospital, and one of the few by whom anatomical lectures were at that time delivered. In 1736 he commenced private practice: in 1745 he was elected assistant surgeon, and in 1749 full surgeon to St. Bartholomew's Hospital. In 1756 he received a severe compound fracture of his leg, and during the confinement which the accident rendered necessary, he commenced writing the surgical works for which he has since been justly celebrated. His first publication was a 'Treatise on Ruptures;' in 1757 he wrote on Hernia Congenita, in 1758 on Fistula Lacrymalis, in 1760 on Injuries of the Head, in 1762 on Hydrocele, in 1765 on Fistula in Ano. At subsequent periods he published observations on fractures and dislocations, cataract, polypus of the nose, chimney-sweeper's cancer, mortification of the toes, and on paralysis from disease of the spine.

In 1787, his time being fully occupied in private practice, he resigned his hospital-surgeoncy, having served the institution for nearly half a century. In 1788 he died.

Mr. Pott's writings are essentially practical, and full of common sense; and the clearness and purity of their style contributed in no slight degree to make them everywhere acceptable. Probably no person of his time had more influence in the improvement of surgery, not indeed by such scientific principles as were established by his early pupil John Hunter, but by the introduction of judicious and simple rules of practice in every subject to which he directed his attention. Many of these rules are still strictly followed both in this country and on the Continent, and some of the diseases which were first described by him still bear his name, as Pott's gangrene, Pott's fracture of the leg, &c.

His works were published collectively in several forms after his death; the best edition is that edited by his relation and successor Mr. (afterwards Sir James) Earle, in 3 volumes, 8vo., London, 1790, and in subsequent years.

POTTER, PAUL, an admirable painter of animals, the son of Peter Potter, an artist of moderate ability, was born at Enkhuysen, in the year 1625. He received the rudiments of his art from his father; and such was his progress, that at fifteen years of age he was held in the highest degree of estimation, and was considered one of the most promising artists of his time. He established himself at the Hague, where he was greatly patronised by Maurice, Prince of Orange, for whom he painted some of his finest pictures. Here he married, in 1650, the daughter of an architect named Balkanende, in whose house he resided, and afterwards removed to Amsterdam. He was naturally of a delicate constitution, which by his unremitting attention to his art he greatly impaired, and died on the 15th of Jan., 1654, in the twenty-ninth year of his age.

The chief excellence of Paul Potter consisted in his painting of cows, sheep, goats, and other animals, in which he makes his landscape a subordinate part, but the animals are executed with a correctness of drawing and a delicacy of touch perfectly astonishing. His pictures usually exhibit a brilliant effect of sunshine, in which the skies, trees, and distances evince a remarkable freedom of hand, whilst the principal parts are finished with the utmost delicacy and minuteness. He sometimes painted as large as life, but succeeded best in cabinet-sized works. One of the most exquisite of the latter is in the collection of the Marquis of Westminster, at Grosvenor-house. It is a landscape with cattle and figures. The scene is a view near the Hague, and the picture was painted for Van Slinglandt, in whose possession it remained till 1750, when it was bought by a collector and taken to Paris, and was afterwards sold to Mr. Crawford of Rotterdam for 1350*l.*, at a public auction in that city. The size is 1 foot 6 inches, by 1 foot 8 inches wide. The marquis is stated to have given 900 guineas for it. Though the preference is given to his smaller pictures, there is one of a herdsman and cattle, the size of life, which formerly belonged to the Prince of Orange, and is now in the gallery of the Louvre; it is designed and executed with surpassing truth and character, and gained for the painter the title of the Raffaelle of animals.

Paul Potter designed every object from nature, and it was his constant practice, in his walks in the fields, the only recreation he allowed himself, to sketch every object that attracted his attention; hence in his pictures he ensured the greatest fidelity to nature. Like other Dutch painters, his subjects are sometimes grossly offensive, but in all his cabinet works the execution is deserving of the very highest praise. There are many beautiful etchings by him executed in a masterly style: some are marked *Paulus Potter f.*, and others *in. et f.*, and a great number of his designs have been spiritedly etched by Mark de Bye. (Bryan's *Dict.*; Pilkington's *Dict.*; *Biographie Universelle.*)

POTTER, JOHN, D.D., born 1674, died 1747, an eminent prelate of the English church, was born at Wakefield in Yorkshire, where his father, Mr. Thomas Potter, was a linendraper, and educated in the grammar-school of that town. At the age of fourteen he entered as servitor of University College, Oxford; took the degree of B.A. in 1692, and in 1694 became fellow of Lincoln College. He had by this time made great attainments in classical learning, and though so very young, was encouraged by Dr. Charlett, the master of University College, to publish a collection which he had made of various readings and notes on the treatise of Plutarch 'De audiendis Poetis.' This was published in 1694, and was soon followed by a similar work, namely, various readings and notes on an oration of Basil. His greater works soon followed: his edition of Lycophron, and his 'Archæologia Græca,' or Antiquities of Greece, both published in 1697. It is almost incredible that works such as these could have been produced by a young man scarcely past his twenty-third year. His Lycophron was reprinted in 1702, at which time he had gained a continental reputation, as appears by his dedication of it to Grævius. His 'Grecian Antiquities' soon became and still continues to be a popular book, having been often reprinted; but it is now far behind the present state of philological knowledge. It contains abundant proofs of the author's learning, but it also shows that he possessed little critical discrimination, a fault however which he shared in common with many other scholars of that time. It was published, in Latin, in the 'Thesaurus' of Gronovius. In 1698 he entered into holy orders, and from that time his studies appear to have been almost exclusively professional, and he passed from one preferment in the church to another till at last he reached the highest dignity. Archbishop Tennison made him his chaplain, and gave him the living of Great Mongeham in Kent, and subsequently other preferment in Buckinghamshire and Oxfordshire. He became chaplain to Queen Anne, and Regius Professor of Divinity in the university of Oxford with a canonry of Christ Church, and in 1715 bishop of Oxford. This he was said to owe to the interest of the Marlborough family. In the same year he published an edition of the works of Clemens Alexandrinus, in 2 volumes, folio, which is still the best edition of that author. His other publications were sermons and charges, and a discourse on church government. In 1737 he was made archbishop of Canterbury, which high station he supported with much dignity to the time of his death. His theological works were published at Oxford, in 3 vols. 8vo., 1753.

POTTER, ROBERT, was born in 1721. He was educated at Emanuel College, Cambridge, and took his degree of B.A. in 1741. He was successively appointed vicar of

Scarning in Norfolk, prebendary of Norwich, and vicar of Lowestoft and Kessingland, in the diocese of Norwich. He died August 9th, 1804, in his eighty-fourth year.

Potter published a volume of poems in 1774, and translations of Æschylus in 1777, of Euripides in 1781-82, and of Sophocles in 1788. Of these translations that of Æschylus is the best, and perhaps gives to an English reader as good an idea of the original as a translation can supply. Potter also published 'An Enquiry into some Passages of Dr. Johnson's Lives of the Poets,' 1783; 'a translation of 'The Oracle concerning Babylon' and the 'Song of Exultation' from Isaiah, c. xii., xiv, 1785; and 'A Sermon on the Thanksgiving for the Peace,' 1802.

POTTERY. As porcelain is only a finer kind of pottery, the following description will comprehend the mode of manufacturing both articles.

In the beginning of the last century, it was ascertained by experiment that the earths alone are infusible, but that when silex is combined with aluminous earth, and subjected to a strong fire, it unites chemically with the clay, as an acid to a base; and that when a third earth, having alkaline properties, as lime, magnesia, or barytes, is added, a more complete change is effected, and a vitrified body is produced, resembling in density and fracture many natural gems. When the earthy materials are free from metallic matter, a perfect porcelain is thus produced. It was found that seven parts of silex, six parts of aluminous earth, and two parts of an alkaline earth, would produce such a body. On this principle the Germans and French founded their china manufactures. In England the enterprising spirit of Wedgwood wrought a complete revolution in the art, and by bold experiments, guided by his knowledge of mineralogy and chemistry, he laid the sure foundation for all those improvements which have raised the earthen manufactures of this country to an eminence which our continental neighbours are now labouring to rival.

We shall now describe the practice of a pottery as carried on in Staffordshire, where the trade has long flourished to a great extent, and now affords subsistence to a population of seventy thousand persons.[*]

The materials for earthenware are reduced to the consistence of cream, in which state they are called *slips* (slops): this fluidity is necessary to ensure the perfect mixture of all the ingredients, and their mutual chemical action in the fire. The basis of the composition is a clay from the plastic-clay formation in Devonshire or Dorsetshire, to which is added ground flint, which gives whiteness and solidity to the goods. For the better kinds, a portion of China-clay, or decomposed felspar from Cornwall, is added, together with a small quantity of ground white granite. By this means the density of the ware is increased, greater purity of whiteness is obtained, and also a degree of vitrification which makes the ware sonorous when struck.

The clays are thrown into their several vats sunk in the ground, where they are blended with water, and sifted, through fine silk lawns, into other receptacles, and then diluted with water until a pint measure of clay slip weighs exactly twenty-four ounces; flint and granite slips are made to weigh thirty-two ounces; thus the potter mixes by measure, while his calculations are formed upon the known weights of the several earths that he is using. The mixture is made in a vat, the sides of which are perfectly vertical, and the quantity of each material to be used is marked by notches on a rod or guage-stick, which the foreman, who superintends this process, dips into the vat, while the slipmaker pours in the slips, until each rises to its proper mark on the mixing-rod. The whole is now thoroughly incorporated, and it is lifted by a pump into a vessel, from which it descends, through a tap, into a silk sieve, which is kept in constant agitation while the fluid is passing through it. This process of sifting is repeated once or twice more, in order to ensure not only the fineness of the body, but the complete amalgamation of all its parts. The slip is then pumped on to a boiler, or slip-kiln, the bottom of which is formed of large flat fire-bricks, under which four or five parallel flues pass from the fire-place to a high chimney. The water is then evaporated, until the boiling mass is brought to a proper consistency for working; but, the steam having given it a cellular and porous texture, it requires to be beaten or wedged until the air is driven out and a section of the mass, when cut, is smooth and compact.

The business of the slip-house requires the utmost vigilance on the part of the potter. Ruinous losses have often been suffered through inattention to this department, and the error has not been detected until the goods have been finished, when the circumstance of the glaze peeling off, or the body of the ware splitting, warns the unfortunate manufacturer to look to his materials, or the bad management of the slip-house.

The following are useful and safe forms for the mixture of earthenware bodies.

Cream-colour or *Printed Ware.*—

Dorset clay . .	56 or	60 or	66
China clay . .	27	18	17
Flint . . .	14	20	17
Cornish granite .	3	2	

Drab-coloured Ware is made of the fine grey marl found between the coal strata, which burns to a cane-colour in the oven; or a white body, as above, is stained with oxide of nickel, which gives it a greenish drab tint; or with oxide of manganese.

Drab body.—	Cane marl .	32 or	— or	56 or	26
	Dorset clay .	22	43	20	46
	Cornish granite	45	50	24	25
	Oxide of nickel	1	7	—	—
	Manganese	—	—	—	3

The granite in the above bodies gives great density and a very close flinty fracture.

Brown or Chocolate bodies are made with a basis of the red ochreous clay, obtained from the red-marl formation above the coal strata. A great variety of tints may be obtained by judicious combinations of oxides of iron, as umber, calcined copperas, bole, &c.

Brown.—	Red clay . .	83 or	60
	Dorset clay . .	13	30
	Flint . . .	2	10
	Manganese . .	2	

Egyptian Black, for tea-pots, ink-stands, &c., is made in the same way, but with a larger portion of the oxides of iron and manganese.

Black.—	Red clay . .	45 or	34
	Dorset clay . .	36	42
	Manganese . .	13	12
	Protoxide of iron .	6	12

Blue bodies are produced by the mixture of a small quantity of oxide of cobalt with a fine white body; when made of vitrescent materials, so as to give a gem-like surface without glazing, it is termed jasper. This beautiful article is well known by the splendid productions of Mr. Wedgwood, whose medallions and cameos maintain their unrivalled excellence to the present time.

Jasper bodies.—

Sulphate of barytes	48 or	Carbonate of barytes	34
China clay . .	16	China clay . .	15
Dorset clay . .	24	Dorset clay . .	15
Flint . . .	10	Cornish granite .	33
Gypsum . .	2	White lead . .	3

These mixtures give a fine white body for ornaments, which may be stained blue by the addition of from one-third of a part to one per cent. of oxide of cobalt, according to the strength of tint required; or a green jasper may be produced by staining with protoxide of chrome.

A body called turquoise has been manufactured to a great extent for a few years past. It is nothing more than a good white body, stained with a mixture of oxide of cobalt combined with a large proportion of oxide of zinc; when glazed, it has the peculiar milky tint of the gem after which it has been named.

In this manner, by a proper combination of metallic oxides, either as existing in earthy materials, or prepared from their metals, an infinite variety of coloured bodies may be produced. They are usually prepared on slip-kilns of small dimensions, the bottoms of which are covered with a layer of plaster of Paris, if used for the finer colours.

Having described the operations of the slip-house, we proceed to those manipulations by which the clay is formed into vessels. Round articles, which may be turned upon a lathe, have their form given upon the thrower's wheel, which is a lathe with a vertical spindle, having a small round table on the top, at which the thrower sits. He receives the clay prepared to the proper size by a woman, called the baller, and throws it upon the whirling table between his knees, which is put in motion by the wheel-woman, whose eye watches every motion of the thrower, and regulates the velocity of the work with perfect accuracy. The thrower first draws the clay up into a pillar, then depresses it into a flat cake, until the whole mass has been drawn into a circular arrangement of all its parts. He then opens the hollow of the vessel with his thumbs, and continues to draw out the clay, or press it inwards, until the desired shape is given to it. It is then cut from the table by a brass wire, and placed on a board, which, when full, is carried into a stove-room to harden.

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[*] The subject of pottery has been partly treated under EARTHENWARE. As this article will explain the processes of this important branch of industry in the English potteries at the present time, it has not been considered necessary to avoid all repetition of what may have been said under another head a few years ago.

When a number of vessels of the same size are to be thrown, a guage is fixed so that its point just touches the top edge of the article when it is revolving; this fixes both the height and diameter of all that are made after.

When the vessels are sufficiently hardened, they are turned upon a lathe similar to that used by wood-turners. The turner dexterously shaves away the clay to the proper thickness, and works the mouldings, &c., polishing the whole with a steel burnisher. Eccentric movements are sometimes used, by which the turner produces ornamental lines and variations of the surface; but this kind of work having lost its value owing to the caprice of fashion, there are now few workmen who are able to execute such beautiful specimens of the turner's art as were common about forty years ago. The shavings of clay are carefully returned by the turner to the slip-house, where they are blended with new clay, the ductility of which is much improved by the mixture.

The turner frequently ornaments bowls, jugs, &c. with a coating of various coloured clays, which are sometimes blended with each other, so as to give a marbled surface. By these earthy pigments he produces an infinite variety of patterns. This kind is called dipped ware.

Such articles as require handles and spouts are then passed to the handler, who makes those appendages in plaster moulds, and sticks them to the vessels with liquid clay. Plain handles are pressed by a syringe through a hole of the proper size and form, and as the clay comes through in long strings, it is cut off, and bent into the desired shape for the handle.

Thrown and turned goods are sometimes ornamented with figures in relief, which are made out of flat moulds by children, and fixed upon the ware by workmen, who, having carefully adjusted each figure to its place, run a little water under it with a camel-hair pencil, which unites it to the surface of the pot. Goods of an oval or angular shape, which cannot be turned, are made by pressing clay into plaster moulds, which give the outside form to the vessels. For this purpose the mould is made in two parts, and each is separately filled by laying in a cake of clay which has been beaten out to the proper thickness on a wet plaster-block; it is pressed into the mould by repeated blows from a ball of wet sponge, then squeezed into all the angular parts with the fingers, and smoothed with sponge, wet leather, and horn. When both sides of the moulds are thus lined with clay, they are joined together, and the man lays a roll of clay along the inside of the joining, which he works down until the whole is smooth and solid. The mould is then carried into a stove-room, and when the mould has absorbed the moisture, so as to release the clay, the work is then carefully taken out, and the empty mould returned to the stove previous to being filled again. The seam which remains on the outside of the vessel is removed by scraping and burnishing with wet horn: the handles and other appendages are then attached. This branch of the trade is called *hollow-ware pressing* or squeezing.

Flat-ware pressing is performed, on the contrary, by giving the shape to the goods by moulds which fit the *inside* of the vessel; plates, dishes, saucers, cups, and hand-basins are made on this principle by the English potter, with a dexterity which must be seen to be understood, and which excites the surprise of foreigners more than any other branch. The workman stands at a bench provided with a whirling-table similar to the thrower's, but which has its motion given by a horizontal pulley or jigger, which is turned by his young assistant. Close to his left hand is a *batting-block* of wet plaster and the mass of well-beaten clay from which he is working; immediately behind him is the stove-room, in which the moulds are ranged on shelves. All being ready, the plate-maker cuts his clay into lengths with a wire, and tears off a piece which he *batts out thin* upon his block by a stroke or two of his *batter* or plaster-mallet, and polishes the surface by pressing the side of a long smooth knife across it. During this process, which occupies but a few seconds, the boy has brought a mould, placed it upon the whirler, and taken his place at the handle of the jigger: the man places the clay upon the mould, and as it whirls, presses it down close with his hand; a profile, or earthenware tool which gives the form to the bottom of the plate, is pressed upon it as it revolves, the superfluous clay being cut off by a wire: the boy instantly catches hold of the mould thus covered with a coating of clay, and runs with it into the stove, places it on a shelf to dry, and returns with an empty mould; by which time his master has his clay prepared for another plate. Thus the operation is continued during working hours, the man and his little bare-footed assistant moving in perfect harmony, as if their several limbs were all under the volition of one mind. When sufficiently hardened, the bottom of the plate is polished, and when taken off the mould, the edges are smoothed and polished with moist leather. Cups, saucers, and hand-basins are now made by this process, instead of being thrown and turned as formerly. By this means they are supplied at a cheaper rate; one man and a boy being able to manufacture the articles which by the old mode requires the work of three men and three females.

Casting is resorted to when a mould is so intricate as to be difficult for the workmen to fill by pressing. Slip clay is poured into the mould, which rapidly absorbs the water; and a coating of clay is deposited upon the inside; the remaining fluid is then poured out or drawn with a syringe, and a thicker mixture is put in, and left rather longer than the first before it is withdrawn. The mould is then put into a stove to dry. Goods thus made are very light.

When completed by the workman, the goods are placed on boards to dry, before going to the biscuit-oven, in which they receive the first fire. The biscuit-oven is a cylinder of fire-brick, hooped with strong bands of iron, like a cask: the ordinary size in Staffordshire is fifteen feet in diameter, and about seventeen feet high, inside measure. Nine fire-places or *mouths* are built round it, from which short chimneys ascend within the oven; other flues, to conduct the flames, are ranged from the mouths under the hearth of the oven, and converge to a pit in the centre, from which the flames ascend through the midst of the oven: the heat is thus distributed as equally as possible, though an equal temperature throughout the whole oven can never be obtained. Goods which will bear the highest heat are therefore placed in the outer range, where they receive the full force of the flames entering from the mouths; while coloured ware, and other articles which could not sustain such a temperature, are placed in the inner parts of the oven. The ware to be thus burnt is placed in saggers made of crucible clay; in shape they resemble hat-boxes, and being piled in columns, each sagger covers the one beneath it, and protects the goods from the immediate contact of smoke and flame. The consumption of these saggers is very great, and forms an important item in the expenses of a pottery. When the oven is filled, the doorway is built up with fire-brick, and butted with a compost to prevent the access of air. Apertures are left at the front and back of the oven, closed with a brick, which can be withdrawn at pleasure; opposite these the *trial* saggers are placed, containing the pyrometers, which are drawn out at intervals by the fireman. These trial-pieces, or pyrometers, are hoops of Egyptian black clay, which when unburnt are of a red colour, but change in the fire, through all the intermediate tints, to a deep black: the well practised eye of the fireman can thus ascertain the state of the oven, and accelerate or check the ardour of the fire in the different mouths as he may think proper. The fire for a few hours is kept very moderate, until the goods are thoroughly dried and the whole contents of the oven warmed; the fire is then gradually increased, until the whole is brought to a white heat. In this operation a biscuit-oven consumes about eleven tons of coals; and requires near forty-eight hours for its completion. When the oven is cooled, the doorway is opened, the saggers brought out, and their contents submitted to a rigid scrutiny: all cracked and crooked pieces are rejected and thrown away; the workman in most cases loses his work, such bad articles not being paid for, and the master loses his materials. The ware is now called biscuit, and in this state goes to the printer or biscuit-painter to be ornamented.

The printing of earthenware is effected by transfer-papers from engraved copper-plates; the wear of which is so great as to give employment to a great number of engravers, and to form, together with transfer-paper, saggers, and coals, a large part of the prime cost of earthen manufactures. A set of engraved plates for a table-service commonly costs 130*l.* or 150*l.*; and will, with proper care, print 2000 dozen services before it wants recutting. The ink used in printing is made of linseed-oil, boiled with litharge, rosin, balsam of sulphur, or Barbadoes tar; almost every printer has his favourite recipe for making this tenacious oil, which is the vehicle of the colour to be used.

Blue colour is made of oxide of cobalt, mingled with flint or carbonate of lime so as to dilute it to the proper tint.

Lilac, of smalts 2 parts, manganese 1.

Brown, zaffre 2, litharge 2, antimony 1, manganese 1.

Red-brown, manganese 12, litharge 2, flint 2, glass 1, borax 1.

Orange, litharge 6, antimony 4, oxide of tin 1, oxide of iron 2.

Pink, subchromate of tin and carbonate of lime, equal parts.

Green, oxide of chromium. The tints varied with cobalt or tin.

Black, red-lead 60, antimony 25, manganese 15, fritted together; then add oxide of cobalt 40, oxide of tin 5.

The colour having been ground very fine, the printer blends it with his oil upon a hot stove, and filling the engraved plate with it, takes off the impression by the common rolling-press. The tissue-paper used for this purpose is first prepared with a solution of soap. As soon as the print is taken, a little girl cuts out the engraving with scissors and hands it to the transferer, who carefully places the print upon the biscuit-ware, which being absorbent, holds it with great tenacity. The transferer then passes it to her assistant, who with the end of a cylinder of flannel, tightly rolled and bound with twine, rubs the print with such force as to work the ink into close contact with the biscuit. The goods thus coated with paper are then put into a tub of water, and the paper being wiped off with a sponge, every minute point of the engraving is found accurately transferred to the earthenware. When dry, the goods are packed close in a large muffle, or kiln, round which a fire circulates, and brings the whole to a low red heat. By this means the oil is burned out of the colour, which would be injurious to the process of glazing which follows.

Some patterns are executed on biscuit by painters, who lay on the colours in gum-water, in which case the firing in the muffle is not required; but the choice of colours in this kind of painting is rather limited, as the heat of the glazing-oven and the chemical action of the materials of the glaze would be destructive to many colours which are used by the enameller upon the glaze.

The biscuit-ware, thus ornamented, is carried to the dipper, who dips each piece into the tub containing the finely-ground mixture which, when melted, forms the glassy coating to the ware. This glaze is blended in water, which, being absorbed by the biscuit, leaves a thin cover of glazing-powder upon the surface; a dexterous shake of each piece in a circular motion, as it emerges from the fluid, prevents the glaze from setting unequally, and throws off all that is superfluous. The composition of glazes requires much attention from the potter; if not sufficiently soft or fluent, the goods are deficient in brightness, and are rough at the edges; if too much so, the glaze runs down unequally, and is apt to craze. The glaze also requires to be adapted to the body which it is to cover and to the colour of the ornaments. Blues require a glaze which will supply oxygen, to bring the cobalt to the state of peroxide; while greens, on the contrary, should be covered with a glaze as free from oxygen as possible, and rather carbonaceous, in order to bring the chrome to the state of protoxide. The white-lead or nitre, therefore, which are beneficial in the first case, are very injurious in the latter.

The following glazes are excellent, and have been successfully used in the Staffordshire potteries; they must be ground very fine at the mill:—

Cream-colour glaze.—White-lead 66, Cornish granite 22, flint 12.

Printed-ware glaze.—White-lead 45, Cornish granite 28, flint 13, flint-glass 14.

In these forms, the ingredients are simply ground together, and are therefore called 'raw glazes,' in distinction from such as have a portion of the materials first united by calcination into a frit, or incipient glass; by this practice, a more complete combination is effected, a thinner coating of glaze will suffice, and the ware in consequence is less liable to craze with change of temperature.

Fritted glaze.—Cornish granite 30, flint 16, red-lead 25, soda 12, borax 17. Mix, and calcine in the easiest part of the gloss-oven, in saggers lined with flint; then take of the frit 26, Cornish granite 15, flint-glass 10, flint 9, white-lead 40. Grind the whole with a little oxide of cobalt, to increase the whiteness.

Drab-ware glaze.—Litharge 56, Cornish granite 20, flint 24.

Blue glaze.—Flint 40, borax 24, red-lead 16, Cornish granite 7, soda 5, oxide of tin 5, oxide of cobalt 5. Calcine it together, then grind with the addition of a little pearl-ash.

Green glaze.—Dissolve six pounds of sulphate of copper, and precipitate it with a solution of borax; to which add 10 quarts of white glaze.

Yellow glaze.—Colour a white glaze with king's yellow, to the depth of tint desired; or chromate of lead.

Black glaze.—Red-lead 74, flint 14, manganese 10, protoxide of iron 2.

When the goods have been dipped in the glazing mixture, they are dried, and placed in saggers, which are washed on the inside with a compound of glaze with lime and clay. Every piece is carefully placed so as not to touch another; otherwise, when the glaze melts, they would stick together. A variety of contrivances called cockspurs, triangles, stilts, pegs, &c. are adopted for the purpose of preventing adhesion; while the sagger is so filled that there may be no room lost. The glazing-oven is much smaller than the biscuit-oven, being about 13 feet in diameter and 15 feet high, and consumes seven tons of coals at one firing. When drawn from the oven, the ware is carried in baskets to the glossed warehouse, where it is again subjected to a close examination: every piece is sounded, and all the projections of glaze occasioned by the cockspurs, &c. are chipped off with steel chisels or files: it is then ready for sale.

We have thus far described the potter's art as it is practised in Staffordshire, where it is carried to a degree of perfection which has enabled the enterprising manufacturers of that district to secure a good recompense for their industry in all countries which are not closed against them by fiscal regulations. In addition to our own colonies, the United States of America, South America, the north of Europe, Italy, and the Levant are largely supplied from the Staffordshire potteries. [EARTHENWARE.]

PORCELAIN is a finer species of pottery, in which the ingredients are so contrived that they act chemically upon each other, and are brought to a state of vitrification; the fracture has a dense or greasy surface, like that of a flint stone, and is therefore not liable to be acted upon by acids. When the porcelain is coloured by metallic matter, it is called stone-ware; jasper and some drab-ware are of this description: but when it is perfectly free from colouring matter and is translucent, it is called China; of which there are two species, hard and soft china.

Hard china is made of silex, generally a fine sea-sand, kaolin, or china-clay, and felspar; sometimes the felspar is omitted, and a small quantity of selenite, or carbonate of barytes, or strontian, is used in its place.

Hard China body.—Kaolin 70, felspar 14, sand 12, selenite 4. The mixture is sometimes made in lime-water, and must be ground very fine at a mill.

When the paste is moulded into the desired forms, it is fired in the biscuit-oven at a very moderate heat; when taken out, it is very bibulous, and opake. In this state it is dipped in the glaze, which is felspar, ground fine, with the addition of a little alkali. Some prefer a mixture of felspar and broken china ground together. It is then submitted to a second fire of great intensity, which not only melts the glaze on the surface, but vitrifies the entire mass, which thus unites with the softer matter on the surface so completely, that the glaze does not form a coating of glass upon the body, but appears like the surface of a stone polished by a lapidary. This homogeneity prevents any crazing; but this process is one of much hazard, for if the fire is prolonged beyond the critical moment when the vitrification is effected, and the surface has become bright, the goods will melt, and sink in the saggers. Oriental, French, and German china are made on this principle; but the English have followed the safer practice which we shall next describe, and which the French manufacturers, aware of its advantages, are now adopting.

Soft or Tender China is made by firing the biscuit to its full vitrescence in the first oven, the shape of the articles being preserved, during their vitrescence, by being imbedded in flint-powder, &c.; and then glazing in the second oven at a lower degree of heat, so as not to endanger the melting of the goods. The union between the body and the glaze is however more complete than in earthenware, the glazing-fire being much more intense. Bones calcined and ground are largely used in the manufacture of English china, combined with aluminous and silicious earths in such proportions that they will vitrify together. This effect is promoted by the phosphoric acid of the bones, which at a high heat diffuses itself through all the materials, and unites them into a translucent enamel, which is less apt to sink and lose its form than the hard porcelain; it therefore may be made in larger ovens, and with less risk of loss to the potter.

English China body.—Bone 46, china clay 31, Cornish granite 23. For large pieces, such as dishes, &c., a little Dorset clay is added, to give more ductility in working and more stability in the fire; but when great purity of whiteness and transparency are wanted, a higher degree of vitrescence is obtained by fritting silex and bone together as the basis of the body.

Fritted China body.—Bone 55, Lynn sand 27, potash 2, calcined together; then ground fine, with china clay 18.

Glaze for China is harder than for earthenware: the following are very excellent. Cornish granite 25, soda 6, borax 3, nitre 1; mix, and frit in gloss-oven; then take frit 26, Cornish granite 26, white-lead 31, flint 7, carbonate of lime 7, oxide of tin 3. The whiteness is increased by the addition of a little oxide of cobalt.

Another China glaze.—Felspar 38, Lynn sand 24, carbonate of lime 11, borax 27: to be fritted. Then take frit 60, Cornish granite 20, white-lead 20.

The application of the glaze and mode of firing are the same as already described.

The decoration of china by enamel colours and gold affords employment to a great number of both sexes, some of whom attain great excellence in their beautiful art. The colours used are all prepared from metallic oxides, which are ground with fluxes, or fusible glasses, of various degrees of softness, suited to the peculiar colours with which they are used. The flux of most general application is made of red-lead 6, borax 4, flint 2. When painted, the goods are placed in the enamel-kiln, where the fluxed colours melt, and fasten to the glazed surface, forming coloured glasses. The judicious management of these mixtures requires much study, and is still susceptible of improvement by the aid of chemical science.

Blues are made from cobalt, varied by the addition of the oxides of zinc or tin. Phosphoric acid gives it a rich purple tint; alumine also varies its hue.

Green is from oxide of copper, melted with a soft flux, and ground; its tints are varied by adding blue or yellow or white enamel. Fine greens, which bear a fire that destroys a copper-green, are made from protoxide of chrome, varied with the addition of cobalt, lead, tin, or alumine.

Red.—Nitrate of iron, dichromate of lead, or muriate of manganese.

Pink.—Subchromate of tin.

Rose colour.—Gold and tin (precipitate of cassius) with a little silver.

Brown.—Chromate of iron or antimony, lead, and manganese.

Orange.—Antimony, tin, and iron.

Yellow.—Antimony, tin, and lead; also chromate of lead.

Black.—Oxide of platinum or iron, cobalt, nickel, and antimony.

White.—Arsenic and tin.

An infinite variety of tints may be obtained by a skilful combination of the above with suitable fluxes, the description of which in detail would exceed our limits. Few potters prepare their own colours; they are supplied by persons who devote themselves to that art.

Gold is applied to china in the state of amalgam ground fine in turpentine with a metallic flux. Thus, gold oxidized by being thrown in a melted state into aquafortis, 1 ounce; quicksilver 14 pennyweights, oxide of bismuth 1 pennyweight, chloride of silver 2 pennyweights. In the enamel-kiln, the bismuth and silver melt, and fix the gold to the china, without involving it so as to prevent its being burnished, which process is performed by females with agates.

POTTO. The *Yellow Maucauco* of Pennant, according to whom the last-named animal is *Viverra caudivolva* of Schreber, was called a *Potto* by its keepers. It had a prehensile tail, as also has the *Kinkajou* of Buffon, which Pennant describes as distinct from the *Yellow Maucauco*, though by form and manners a proper concomitant of it.

Pennant thus describes the *Kinkajou* after Buffon:—

Weesel with a short dusky nose: tongue of a vast length: small eyes, encircled with dusky: ears short and rounded, and placed very distant: the hairs short; on the head, upper part of the body, and the tail, the colours are yellow, grey, and black intermixed: the sides of the throat, and under side of the inside of the legs, of a lively yellow: the belly of a dirty white tinged with yellow: the toes separated: the claws crooked, white, guttered beneath. The length from head to tail two feet five (French); of the tail, one foot three: the tail is taper, covered with hairs, except beneath near the end, which is naked, and of a fine flesh-colour. It is extremely like the former (Yellow Maucauco); but larger in all its parts. Like the Yellow Maucauco it has a prehensile tail, and is naturally very good-natured: goes to sleep at approach of day; wakes towards night, and becomes very lively: makes use of its feet to catch at anything: has many of the actions of the monkey: eats like a squirrel, holding the food in its hands: has a variety of cries during night; one like the low barking of a dog; its plaintive note is cooing; its menacing, hissing; its angry, confused. Is very fond of sugar, and all sweet things: eats fruits and all kinds of vegetables: will fly at poultry, catch them under the wing, suck the blood, and leave them without tearing them: prefers a duck to a pullet; yet hates the water.

The *Kinkajous* which we have seen (and though two species have been described,[*] we believe that there is but one at present known) have not any part of the tail naked, and therefore, if Pennant's description be correct, his *Kinkajou* must be a different animal from that generally known under this name. They belong to the genus *Cercoleptes*, Ill., a South American form. Pennant names his *Kinkajou*, the *Mexican Weesel*.

Mr. Swainson treats the *Potto* and *Cercoleptes caudivolvus*, the name labelled on the three specimens of *Kinkajou* in the museum of the Zoological Society, as identical; and so do the French and Fischer. 'We have now,' says Mr. Swainson, 'only to consider the other animal above alluded to, namely, the Potto (*Cercoleptes caudivolvus*). This singular quadruped is a native of tropical America; and not only in its aspect, but in its general structure, has so much the appearance of a Lemur, that nearly all modern zoologists have placed it within or adjoining the confines of that family. Like them it has a very long hairy tail, which is moreover prehensile; it is a nocturnal animal with large eyes, and seems naturally to feed upon vegetables. It climbs like a Lemur, with agility; and Humboldt affirms it to be a great destroyer of wild bees'-nests, which it opens for the sake of feeding on the honey. On comparing the teeth of this animal with those of the Lemur, it will be perceived that there is a much greater resemblance between the two than there is between those of the Lemur and the Aye-Aye; although in the former comparison sufficient difference exists to exclude the *Potto* from the circle of the *Lemuridæ*. Baron Cuvier places the genus *Cercoleptes* close to the Badgers,[†] yet implying doubts as to this being its true situation; but his brother Frederick, with more judgment, looks on it as a passage from the *Lemurs* to the *Feræ*, although he thinks that its essential characters are different from either. In this opinion we perfectly coincide, because it is not only supported by facts of structure, but by other important considerations which bear upon the question. From *Cercoleptes* there is no difficulty in our passage to the Opossums through *Paradoxurus* and *Dasyurus*; so that the affinities between the orders of *Quadrumana* and *Feræ* are uninterrupted by anything known, and are found to be in union with that law of nature which invariably unites the typical and subtypical group.'

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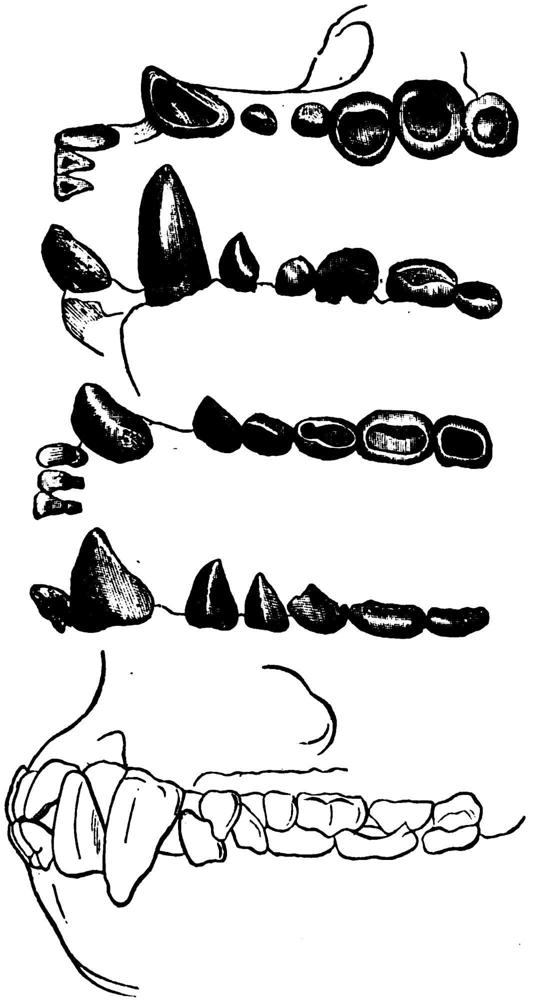
[*] 'Zool. Proc.,' 1836, p. 81.

[†] But next to the Coatis (*Nasua*, Storr).

Dental formula of *Cercoleptes*:—

Incisors $\frac{6}{6}$: canines $\frac{1-1}{1-1}$: molars $\frac{5-5}{5-5}$ = 36.



Teeth of Potto or Kinkajou, twice the natural size. (F. Cuv.)

Cercoleptes caudivolvus.

The *Kinkajou* is very mild in captivity, and climbs about the chairs, &c. in a room, if suffered to go at large. The tail does not seem to be very prehensile, nor does it appear to afford much assistance to the animal in climbing or descending. [Perodictus; Nycticebus.]

POULTON. [Lancashire.]

POULTRY, from the French *poulet*. The term includes all the domesticated birds reared for the table fowls, turkeys, geese, ducks, and Guinea fowls.

Fowls.—'The strong and ambulatorial feet of the gallinaceous birds adapted to the region where they chiefly resort for their food and the purposes of incubation; their toes and nails peculiarly formed for scratching up the grains and seeds which constitute the main part of their subsistence; their short wings and the weakness of their pectoral muscles, which cause the heaviness of their flight, a deficiency which is counterbalanced by the strength of those muscles of the thighs and legs that contribute to their powers of running; their gregarious, and, generally speaking, polygamous habits; the ease with which they are domesticated; their wholesome flesh; together with many striking peculiarities in their anatomy, serve equally to distinguish them.'*

Some foreign varieties have not even the rudiment of a tail, while others are distinguished by it. The game cock, which is probably a native of India, though for many centuries established in England, has an unusual length of spur, his natural weapon of combat. The flesh of this variety is delicately white and of the finest flavour, the plumage brilliant, and the form symmetrical; but from their pugnacious temper, there is great difficulty in rearing even those of the same brood; and for companionship with the general inmates of the fowl-yard they are very exceptionable for the same cause. So pugnacious however are the males of almost every variety, that they will spur even before their spurs are grown. For the natural history and peculiarities of the various varieties, we refer to the article Pheasant; we shall merely notice in this place the kinds suited to the purposes of the farmer.

The best breed of the gallinaceous fowls is the produce of the Dorking (Surrey) cock and the common dunghill fowl. This cross is larger and plumper, and more hardy than the pure Dorking, without losing delicacy of flavour or whiteness of flesh.

The characteristics of the pure Dorking are, that it is white-feathered, short-legged, and an excellent layer. The peculiarity of this established variety, which has frequently five claws perfectly articulated (with sometimes a sixth springing laterally from the fifth, but always imperfect), is well known. The crossing with the Sussex fowl has however greatly diminished the monstrosity in the Surrey pentadactylus variety. But though the true Dorking, which is white, is much esteemed, that colour is rare, and prized for the ornament of the poultry-yard: speckled colours are most generally seen with the higgler.

The Poland breed, which is black-feathered, with white topknots, lays well, and is highly desirable where the production of eggs for the table is the principal object; but they seldom sit, though they cannot be considered long-legged.

The Chittagong, or Malay, which is a very large Indian variety, is generally long-legged, with yellow body and coarse yellow flesh. Fanciers used to like them for their fine appearance and their large eggs; but as their long legs incapacitate them from steady sitting, they are not general favourites. One of our practical acquaintances recommends the male produce of the Poland and Chittagong as a good cross with the common dunghill hen, as their progeny will sit.

Parmentier thus describes the cock:—

'He is considered to have every requisite quality when he is of a good middling size; when he carries his head high; has a quick animated look, a strong and shrill voice, short bill, a fine red comb, shining as if varnished; wattles of a large size, and of the same colour as the comb; the breast broad; the wings strong; the plumage black, or of an obscure red; the thighs very muscular; the legs thick, and furnished with strong spurs; the claws rather bent, and sharply pointed. He ought also to be free in his motions, to crow frequently, and to scratch the ground often in search of worms, not so much for himself as to treat his hens. He ought withal to be brisk, spirited, ardent, and ready in caressing the hens; quick in defending them, attentive in soliciting them to eat, in keeping them together, and in assembling them at night.'†

Those who intend to rear fowls or any kind of poultry on a large scale, should have a distinct yard, perfectly sheltered, and with a warm aspect, well fenced, secure from thieves and vermin, and sufficiently inclined to be always dry, and supplied with sand or ashes for the cocks and hens to roll in, an operation necessary to disengage their feathers from vermin: running water should be especially provided; for the want of water, of which all poultry are fond, produces constipation of the bowels and inflammatory diseases; and for geese and ducks, bathing is an indispensable luxury. A contiguous field is also necessary for free exercise, as well as for the supply of grubs and grass to the geese. The fowl-house should be dry, well roofed, and fronting the east or south, and, if practicable, at the back of a stove or stables; warmth being conducive to health and laying, though extreme heat has the contrary effect. It should be furnished with two small lattice windows, that can be opened or shut at pleasure, at opposite ends, for ventilation, which is frequently necessary; and the perches should be so arranged, that one row of roosting fowls should not be directly above another.

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* Vigors, 'Linnæan Transactions,' p. 402.

† Translated by Mr. Dickson, author of an excellent work on poultry.

M. Parmentier has shown* by what arrangement a house twenty feet long and twelve feet wide may be made to accommodate 150 hens at roost. The plan is simply this:—the first roosting-perch (rounded a little at the upper angles only, for gallinaceous fowls cannot keep a firm hold on perfectly cylindrical supporters) should be placed lengthways, and rest on tressels in each end wall, six feet from the front wall, and at a convenient height, which must depend on the elevation of the house from the floor, which should be formed of some well consolidated material that can be easily swept. Another perch should be fixed ladder-ways (*en échelon*) above this, but ten inches nearer to the back wall, and so on, until there are four of these perches like the steps of a ladder when properly inclined, but with a sufficient distance between the wall and the upper one to allow the poultry-maid to stand conveniently upon when she has occasion to examine the nests, which it is her duty to do every day at least once, and in the forenoon. The highest of these she can reach by standing on a stool or step-ladder. By this contrivance the hens, when desirous of reaching the nests, have no occasion to fly, but merely to pass from one stick to another. If the size and form of the house permit, a similar construction may be made on the opposite side, care being taken to leave an open space in the middle of the room, and a sufficiently wide passage for the attendant to pass along the walls. It is not at all required to have as many nests as hens, because they have not all occasion to occupy them at the same time; and besides, they are so far from having a repugnance to lay in a common receptacle, that the sight of an egg stimulates them to lay. It is however true that the most secluded and darkest nests are those which the hens prefer.

The nests, if built into the wall, are in tiers from the bottom to the top, the lowest being about three feet from the ground, and a foot square. If the laying-chambers consist of wooden boxes, they are usually furnished with a ledge, which is very convenient for the hens when rising.

But the best receptacles for the eggs are those of basket-work, as they are cool in summer, and can be easily removed and washed. They ought to be fastened not directly to the wall, as is generally the case, but to boards fixed in it by hooks, well clinched, and with a little roof to cover the rows of baskets. They will thus be isolated, to the great satisfaction of the hen, which delights in the absence of all disturbing influences when laying. All the ranges of nests should be placed checque-wise, in order that the inmates, when coming out, may not startle those immediately under: those designed for hatching should be near the ground (where instinct teaches the hen to choose her seat), and so arranged that the hens can easily enter them without disturbing the eggs.

Wheaten or rye straw is the most approved material for the bedding, being cooler than hay · the hens are sometimes so tortured by lice as to forsake their nests altogether, in an agony of restlessness. A Dorking housewife has assured us that she once lost an entire clutch, from having, as she believes, given a bed of hay-seeds to her sitting hen. The chicks were all glued to the shells, and thus destroyed, owing, as she thinks, to the high temperature occasioned by the fermenting seeds.

For all purposes two cocks in a good run are considered in the poultry counties contiguous to London as sufficient for twelve or fourteen hens, but in France they allow twenty mistresses to each cock, which no doubt is on account of the higher temperature there. In a confined yard, five hens are sufficient for one cock in our cold country, and a double set will not answer in very limited space. When there are two or more cocks, care should be taken not to have them of equal age or size, for in this case they are always jealous and quarrelsome; if one is decidedly ascendant, the other will never presume to dispute with him. It will be judicious also to avoid the introduction or changing of cocks in the breeding season, for the hens require constant intercourse with them, and several days frequently elapse before they become familiarised with a stranger. The best way is to bring in the new cock in the summer, either as a chick, or late in the year in the moulting season, when he will not take too much notice of the hens. As a general rule it would be well to have one a yearling and the other a year older. In the third year, the cock, who then becomes lazy and excessively jealous, should be killed.

In order to have the earliest chickens, hens should be induced to sit in October, which they may do if they have moulted early. By attention in this particular, chickens can be brought to the market at Christmas. But the object should be in general to set the eggs as soon as possible after Christmas, in order to have chickens with the forced asparagus in March, when they are worth in London from 7*s.* to 10*s.* a couple.

In selecting eggs for hatching, care should be taken that they are not at the utmost more than a month old, but their condition for hatching will greatly depend upon the temperature of the weather: vitality continues longest when the air is cool.

It has been asserted that the future sex of the bird is indicated by the shape of the egg; the round producing the female and the oblong the male. But this is contradicted, and, we believe, with sufficient reason, and it is impossible not only to foretell the sex, but even to ascertain whether the egg be fecundated. This however is certain, that if the air-bag (at the obtuse end), which has been mistaken for the germ, and the purpose of which is to oxygenate* the blood of the chick, be perforated even in the least conceivable degree, the generating power is lost altogether. Those eggs only which have been fecundated by the male are possessed of the vital principle. The number of eggs for a hen should not exceed sixteen, as she cannot impart the necessary warmth to more. It is by no means uncommon with experienced breeders to place two hens on the same day on their respective eggs, and then on the twenty-first day, when the broods are out, to give the maternal charge of both to one of the hens, removing the other to another set of eggs, which, if she be a steady setter, she will hatch as in the first instance. This however must be deemed a cruelty, though some hens would instinctively continue to sit until death. They would however become so attenuated by continued sitting, as to lose the power of communicating to the eggs the necessary degree of warmth. The practice of the Surrey breeders is to feed the hen on oats while sitting, as less stimulating than barley, which they give to the laying hens on account of this very quality.

Some fanciers use artificial mothers, which effect the purpose of imparting the necessary heat to the young chicks after birth, when there is no natural mother nor a trained capon to brood them. These artificial mothers—as used by Mr. Moubray, and described by him—are boxes lined throughout with wood. He recommends that a curtain of flannel should be suspended over the opening of the box for the exclusion of cold air.

Mr. Young states that 'five broods may at once be cherished under an artificial mother. This mother may be framed of a board 10 inches broad and 15 inches long, resting on two legs in front, two inches in height, and on two props behind, two inches also in height. The board must be perforated with many small gimlet-holes, for the escape of the heated air, and lined with lamb's skin dressed with the wool on, and the wooly side is to come in contact with the chickens. Over three of these mothers a wicker basket is to be placed, for the protection of the chickens, four feet long, two feet broad, and fourteen inches high, with a lid open, a wooden sliding bottom to draw out for cleaning, and a long narrow trough along the front, resting on two very low stools, for holding their food. Perches are to be fixed in the basket for the more advanced to roost on. A flannel curtain is to be placed in front, and at both ends of the mothers, for the chickens to run under, from which they soon learn to push outwards and inwards. These mothers, with the wicker baskets over them, are to be placed against a hot wall, at the back of the kitchen fire, or in any other warm situation where the heat shall not exceed 80 degrees of Fahrenheit.

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* 'Dictionnaire d'Agriculture.'

* See the 'Domestic Habits of Birds,' in the 'Library of Entertaining Knowledge,' p. 115

'When the chickens are a week old, they are to be carried with the mother to a grass-plat for feeding, and kept warm by a tin-tube filled with hot water which will continue sufficiently warm for about three hours, when the hot water is to be renewed. Towards the evening the mothers are to be again placed against the hot wall.'

The artificial mother however is only a mechanical house for chicks already hatched; but the process of bringing the embryo of organised life in the egg through all the stages of the vital principle, until it becomes matured, by means of heated ovens, has been long and successfully practised in Egypt.

These ovens, which are constructed with bricks, are about nine feet high, with galleries extending through the whole length, and containing chambers into which a man can creep through a very contracted orifice for the purpose of depositing the eggs, which are laid, to the amount of several thousands, on mats or beds of flax over the brick floors. The heat is conveyed through fire-places, and the material of the slow fires, which are most effective, is the dung of cows or camels combined with straw. The fires are kept up for as many days (according to the temperature of the weather) as are sufficient to impart such a degree of heat as will continue to the expiration of the twenty-one days required for the hatching of chickens, care being taken to confine the warmth by closing up all the orifices communicating with the external air.[*] One hundred millions of chickens are said to be thus annually produced in Egypt.

M. Réaumur made various experiments in hatching with fermenting dung in hotbeds, but unsuccessfully; life was developed, but never matured; the chicks were in some cases even feathered, but long before the full time they lost vitality. He succeeded at length, 'after trials enough to wear out the most enduring patience,' with an oven free from the influence of the vapour exhaled from the dung, which in the previous experiments had been destructive of the embryo. He afterwards succeeded to a great degree by using a box or shelves over an oven, with due regard to uniformity of temperature. Several of the eggs in this latter case were hatched on the twentieth day, by which the usual course of nature was anticipated by one day. But though artificial hatching has long been practised with success in Egypt, it has not been found worth the expense and trouble in France, from the variableness of temperature there compared with that in the Delta, where, in the autumnal season, when the mamals (hatching-ovens) are used, it is remarkably steady and extremely warm.

Since the attempt to pursue the Oriental system has failed in France, there is no probability of its succeeding in the climate of Great Britain, but it by no means follows that success may not attend such management as will obviate the obstructions which arise from irregularities of temperature. The object was partially attained some years ago by means of steam, but uniformity of heat was not preserved, and consequently that experiment failed. It would appear however that the application of the Eccaleobion[†] machinery now exhibited in London by Mr. Bucknell, the inventor and proprietor, may be successful. Mr. Bucknell asserts that his eccaleobion possesses a perfect and absolute command over temperature from 300 degrees of Fahrenheit to that of cold water; so that any substance submitted to its influence shall uniformly be acted upon over its whole surface at any required intermediate degree within the above range, and such heat maintained unaltered, without trouble or difficulty, for any length of time, and that 'by means of this absolute and complete command over the temperature obtained by this machine, the impregnated egg of any bird, not stale, placed within its influence at the proper degree of warmth, is, at the expiration of its natural time, elicited into life, without the possibility of failure, which is sometimes the case with eggs subjected to the caprice of their natural parent.'

That chickens are thus hatched in considerable numbers is unquestionable, upwards of thirty thousand having been already brought into existence by this single eccaleobion machine, nor has any difficulty been found in the subsequent rearing of those chickens when proper yards and suitable temperature were provided, more than in the natural way; indeed in some respects less so, as the losses sustained in poultry by the sudden changes of the weather, and the influence of dampness in particular, and accidents from various causes, are very considerable. Supposing Mr. Bucknell's experiment to answer the purpose in every respect, the increase in the production of poultry might be rendered incalculably great by the adoption of his principle on a great scale, wherever the essentials of a dry soil, warmth, and proper buildings can at the same time be supplied.

'It must have struck even the most superficial observer, that the extraordinary fecundity of gallinaceous fowls is a wise and most benevolent dispensation of nature to provide the more abundantly food for man, as in those tribes of birds not suited for his table the female lays no more eggs than she can incubate. With respect therefore to domestic poultry, the most nutritious of all human food, this rich provision of a bounteous providence is for the first time available to Europe.'[*]

The eccaleobion machine, capable of containing 2000 eggs, resembles an oblong box, nine feet in length, three feet in breadth, and the same in height. It has no connection with the walls, against which it is placed on the table on which it stands; its regulating power is within.[†]

The following striking passage from Mr. Bucknell's work 'On Artificial Incubation,' above alluded to, will show the importance of this subject in its commercial and domestic bearings.

Mr. Bucknell observes (page 16), 'We call the Egyptians barbarous; the procuring however, by art and industry, an abundant supply of that necessary of life, good animal food, is no evidence of barbarism. If the population of the United Kingdom, which as respects Egypt is as twenty-four to two, were as well supplied with this artificial production as Egypt, it would require,—not ninety-two millions, but one thousand one hundred and four millions of poultry annually, for them to be as well fed in this respect as the uncivilised natives of Egypt. But how stands the account in this matter? Full one-third our population subsist almost entirely, or rather starve, upon potatoes alone; another third have, in addition to this edible, oaten or inferior wheaten bread, with one or two meals of fat pork, or the refuse of the shambles, per week; while a considerable majority of the remaining third seldom are able to procure an ample daily supply of good butcher's meat, or obtain the luxury of poultry from year to year.

'On the continent of Europe the population is still in a worse condition:—fish, soups made from herbs, a stuff called bread, made from every variety of grain, black, brown, hard, and sour, such as no Englishman could eat; olives, chestnuts, the pulpy saccharine fruits, roots, stalks and leaves, and not unfrequently the bark of trees; saw-dust, blubber, train-oil, with frogs and snails, make up and constitute a good part of the food of the greater portion of the inhabitants of Europe. There is no other cause for this than the excessive ignorance of its population.'

The contemplation of the progressive stages through which life is developed and matured in the egg, is highly interesting. The contents of the shells, of the species under immediate consideration, taken out and placed on a plate or a saucer on Mr. Bucknell's table, present the following appearances, according to the respective periods:—

On the third day, the embryo organization of the skull, brain, heart, and blood is perceptible by the aid of a magnifying-glass.

Fourth day. The pulsation of the heart is distinguishable by the naked eye.

Sixth day. The chief vessels and organs rudimentally formed; the pulsation and circulation of blood apparent.

Ninth day. Intestines and veins formed, and the deposition of flesh and bony substance commenced; the beak for the first time open.

Twelfth day. The feathers have protruded, the skull has become cartilaginous, and the first voluntary movement of the chick is made.

Fifteenth day. Organs, vessels, bones, feathers, closely approaching in appearance to the natural state.

Eighteenth day. Vital mechanism nearly developed, and the first sign of life heard from the piping chick.

Twenty-first day. The chick breaks the shell, and in two or three hours is quite active and lively.

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[*] For the details and statistics on this interesting subject see the 'Domestic Habits of Birds,' *Library of Entertaining Knowledge*, p. 138.

[†] From 'Εκκαλέω, 'I call forth,' and Βιος, 'life.'

[*] 'Treatise on Artificial Incubation,' by W. Bucknell, Esq., p. 36.

[†] Ibid.

The exit of the chick from the shell is assuredly one of the most interesting processes of animated nature ever investigated by naturalists. It was supposed that the mother bird broke the shell; but M. Réaumur has long since detailed the processes, and we ourselves have witnessed the evolution of the chick in the eccaleobion by its own unassisted efforts. The French naturalist to whom we have just now referred thus explains some interesting facts:—'I have seen chicks continue at work for two days together. Some again work incessantly; others take rest at intervals, according to their physical strength. I have observed some, in consequence of their impatience to see the light, begin to break the shell a great deal too soon; for they ought, before they make their exit, to have within them provision enough to serve for twenty-four hours without taking food, and for this purpose the unconsumed portion of the yolk enters through the navel. The chick indeed which comes out of the shell before taking up all the yolk is certain to droop and die a few days after it is hatched. The help which I have occasionally tried to give to several of them towards their deliverance has afforded me an opportunity of observing those which had begun to break their shells before this was accomplished; and I have opened many eggs much fractured, in each of which the chick had as yet much of the yolk not absorbed. Besides, some chicks have greater obstacles to overcome than others, since all shells are not of an equal thickness nor of an equal consistence; and I think it probable that the same inequality takes place in the lining membrane. The shells of the eggs of birds of various species are of a thickness proportional to the strength of the chick that is obliged to break through them.'[*]

If the chick should be glued to the shell, as sometimes occurs, and is indicated by the faintness of its chip, and the non-enlargement of the fracture for some hours, it must be assisted (but not until the necessity is fully ascertained) in its liberation 'with a key, or some such instrument, and by cutting the membrane with the points of a pair of scissors. The operation, though painful to the chick, does not prove mortal; for it is no sooner freed than it exhibits as much vigour as any other chick of its age.'[†] But unless the chick, after a full day's effort, is found unable to chip the shell, from weakness or adhesion to its envelope, it is better not to assist it in its extrication; for in ninety-nine cases out of a hundred aid proves ineffectual, through the injury inflicted upon the delicate organization of the bird; or more probably the previous weakness or imperfection of the chick, which occasioned the necessity for assistance, also occasions its death at the moment of its birth, and would take place even if its disengagement were effected without any injury.

There is a caution to be observed in all cases regarding the eggs when the chicks are on the verge of maturity: they should not be stirred when within two days of the evolvement of the chicks. If any circumstances render it absolutely necessary to do so, care should be taken to place them with the broad end inclining upwards, as the beak of the chick is then in its proper position; and if this be reversed, the chick becomes unable to chip the shell, and must therefore die.

Chickens should be fed the day after their birth with crumbs of bread soaked in milk or with the yolk of an egg boiled hard, and they will quickly learn to eat curds, grits, and barley-meal and milk: if not designed for immediate use, they should soon get raw corn, and occasionally alteratives of green food, such as bruised leeks, nettles, lettuces, &c. For the first week they should be confined to the house altogether; after that time they may be let out for a short time in the sun, and gradually habituated to the weather. To render the hen which has already discharged her duty still more productive to her owner, she is frequently confined to a coop, called in Surrey a *rip*, for some weeks after the chicks have seen the light. Her offspring during this time pass freely through the prison bars, returning at her call or on occasions of alarm to the maternal wings, and then hopping out again to the inexpressible misery of their imprisoned mother, who is kept in this state of confinement until she becomes indifferent to the chickens and disposed to lay again.

The courage of the hen in defence of her offspring has been a common theme of admiration; the force of her maternal solicitude effects the most surprising change in her disposition and temper. Before she attained her matronly character, she was greedy, and always searching for food, fond of gadding about, and timid in the extreme. Now she becomes generous, self-denying, and intrepid; she assumes the fiery temper of the cock, and becomes a virago in defence of her helpless brood. An anecdote is told by White, in his 'Natural History of Selborne,' of the punishment inflicted by some hens upon a hawk which had at different times killed their chickens. By some means this hawk was caught, and the owner gave him up to the tender mercies of the bereaved mothers. In his own words, 'Resentment suggested the laws of retaliation. He clipped the hawk's wings, cut off his talons, and fixing a cork on his bill, threw him down among the brood hens. Imagination cannot paint the scene that ensued; the expressions that fear, rage, and revenge inspired were new, or at least such as had been unnoticed before. The exasperated matrons upbraided, they execrated, they insulted, they triumphed. In a word, they never desisted from buffeting their adversary till they had torn him in a hundred pieces.'

The same writer calls attention to the language of the fowl, from a pleased twittering to a scream. A laying pullet utters a complacent soft note, but when she has been delivered of an egg, her cackle of delight and importance is loud enough to excite the sympathetic voices of all her companions; when her chickens are hatched, she has a different language, which is intelligible to her little ones. The crested cock has various notes; his tone and language, for such it is in effect, as he calls his favourites to partake of the food which he gallantly scrapes for them, is of a very peculiar kind, and very different from his ordinary voice that is so familiar to us.

Poultry are the better for high feeding from the very shell, and on this account the heaviest corn is often far cheaper for them in the end than tailings, as regards the flesh, or the size and substantial goodness of the eggs. Young chickens may be put up for feeding as soon as the hen has ceased to regard them, and before they lose their first good condition. When chickens are wanted for domestic purposes, they are often left at liberty in the farm-yard, and if they have plenty of good food, they will be in the most healthful state for the table, and rich and juicy in flavour. Mr. Moubray ascertained that pullets hatched in March, if constantly high fed, laid eggs abundantly in the autumn; and if killed in the February or March following, were so excessively fat from the run of the yard as to open more like Michaelmas geese than chickens. Experienced poulterers will fatten fowls in two or three weeks with the aid of grease, which gives a luscious, but, in our judgment, a very disagreeable flavour to the flesh, which, though not actually diseased, is very inferior to that of the fowl fed at large in the common way at the barn-door.

The practice of cramming poultry by the hand is quite common. A machine for this purpose is used in France, by which one man can cram fifty birds in half an hour. It is somewhat on the principle of a forcing-pump. The throats of the birds are held open by the operator until they are gorged through a pipe, which conveys the food from a reservoir below placed on a stool. In fifteen days, fowls are said to attain the highest state of fatness and flavour by this feeding. In addition to the ordinary paste of barley-meal or meal made into little balls with milk, the dried seeds and leaves of nettles have been recommended by the continental poulterers, some of whom give a little henbane-seed to induce sleep, while others put out the eyes of the prisoners as the most effectual way of keeping them in a state of darkness, which is considered essential to their becoming rapidly fat; and under the pretext of relieving them from the irritation of vermin, they pluck the feathers from their heads, bellies, and wings. While fowls are thus preparing for the knife, though their bodies are closely confined, their hinder parts are free for evacuation and cleanliness, and their heads are at liberty to take in fresh supplies of nutriment.

The practice of making capons (emasculating the males) is practised a little in some of the English counties, and very much in France, where the females are also rendered incapable of breeding, and termed in their unsexed condition *poulardes*, in order to give them the tendency to fatten. An incision is made near the parts, and through this the finger is introduced to take hold of and bring away the genitals, but so carefully as not to injure the intestines; the wound is then

[*] 'Domestic Habits of Birds.' *Library of Entertaining Knowledge.*

[†] Ibid.

stitched up and rubbed with oil or grease; and the comb (which appears to be an unnecessary and gratuitous pain and insult to the sufferer) is often cut off. The females are treated much in the same way, when they do not promise well for laying or when they have ceased to be fertile; they are deprived of the ovarium. The subsequent treatment is similar to that in the former case. Care is taken to give them good food for three or four days, and during that time to keep them in a place of moderate temperature, to avoid the danger of gangrene, which, considering the time of the year—midsummer, when the operation is usually performed—is a very probable consequence. Pullets of the largest breed are selected for the purpose, as they yield the greatest weight to the poulterer; and if employed in hatching, cover the greatest number of eggs.

Cuvier states that the capon may be taught to hatch eggs and to act the part of a good nurse, with a little bell round his neck to supply the want of a good voice. He asserts that the natural courage and energy of this bird are not abated by the alteration of his condition, in which his audacity enables him to impose on the cocks and hens, so that they allow him to strut about with his former gait of consequential importance and to fulfil his duties without interference or molestation. This seems incredible, as a bold and haughty spirit under such circumstances is unnatural in the extreme. The pallidness of his head and the diminutiveness of his comb and gills indicate the contrary disposition, and he is so despised by the other fowls that they will hardly condescend to roost with him.

Mr. Young, in his 'Report of the County of Sussex,' says that much art and attention are requisite to make capons, and that the Sussex breed are too long in the body for success in the operation, by which many are lost. A perfectly fat capon will weigh from seven to ten pounds.

As soon as fowls are rendered sufficiently fat, they should be killed, or they will lose flesh and become unhealthy. The most humane and expeditious mode of putting them to death is by a smart blow with a blunt-edged stick, such as a child's bat, at the back of the neck. Higglers break the vertebræ of the neck by a sudden twist, and never bleed fowls, as this mode of dispatching them dries up the juices of the flesh. They bleed turkeys and geese however, after a stunning blow in the neck, not by cutting the throat, but by an incision in the upper part of the mouth.

Store fowls will feed well upon the tailings of corn, potatoes, and insects, and require little attention except when laying, during which time the food for the hens should be abundant, and their roosting-places dry and warm.

The diseases of all poultry principally arise from cold and moisture. Rheumatism decidedly arises from this cause. During or after moulting in a wet season, fowls frequently become diseased, as is evident from their drooping appearance, swelled and watery eyes, and the dropsical affections of the legs. Severe laying also sometimes causes emaciation and illness, which give way to a more healthy condition after the moulting season, if they have good food and dry weather.

Chickens are very subject, in wet or variable weather, to a disease called the chip, which appears in about a fortnight after their birth, when they are changing their feathers. Warmth and sunshine are the only restoratives within our knowledge.

The roup is properly an imposthume upon the rump, which is cured or relieved by opening, squeezing, and bathing with warm water. Mr. Moubray however, who is a good practical authority, states that the roup is a general term for all diseases, though it is chiefly applied to catarrh, which is indicated by watery eyes and running at the nostrils. This last disease resembles glanders in horses, and is infectious, and generally fatal. As all these diseases originate in moisture, dryness and warmth are the best counteracting influences. The nostrils should be washed with soap and water, and the eyes with milk and water. Mr. Moubray recommends a pepper-corn in dough at first, to impart warmth, and afterwards calomel three times a week as a finish to he cure.

We have had the trachea of a chicken dying of the gapes (which is the incipient stage of roup) cut and opened, and have taken out narrow worms, about half an inch in length, which lay imbedded in a serous fluid. A medical gentleman, now in the county of Kent, has frequently cured fowls of the same disease by putting the upper part of a feather, stripped for the purpose, down the trachea, turning it round, and thus bringing up the worm, which he thinks is the sole cause of the disease. It may however be the effect of the malady, as is the opinion of many.

The pip, which the same individual considers analogous to the thrush in the human kind (and which is probably a modification of roup), he cures, not by scraping roughly, but by an application of powdered borax dissolved in tincture of myrrh and water, and rubbed on the tongue with a camel-hair brush two or three times a day. This at the same time assists the bowels. The flux is not uncommon. Solid corn is the most certain remedy for this disease. Taken at the commencement, it is rarely serious, but if once established in the constitution, it becomes incurable, and, according to some, contagious. For constipation, bran or pollard, with milk, beet leaves, and lettuces, afford a certain cure.

Much of the foregoing matter applies to the rearing and management of all poultry. The succeeding observations will be brief.

*Turkeys.**—The greatest weight to which our domesticated turkey can be made to attain is 30lbs., and a turkey of even half this weight is 'a dainty dish.'

'The varied plumage of the bird in the domesticated state is well known to every one; and in no species is that sure mark of subjection to man more strongly seen. Every gradation of colour, from its original bronze, passing into buff, and in many instances into pure white, may be observed in these strutting denizens of our farmyards.' (*New Monthly Magazine*, 'Recreations in Natural History.') The bronze or copper-coloured is not considered hardy, nor often reared, and the varieties may be stated to be only two-fold, the dark-coloured and the light.

The dark-coloured birds are most prized for size and hardihood. Notwithstanding the great price which may be obtained for turkeys in London when fat, the finest young birds may be purchased in Ireland, fit for cramming, in September and October, from 4*s.* to 5*s.* a couple, and the light-coloured and smaller ones frequently from 2*s.* 6*d.* to 3*s.* 6*d.* a couple.

Turkeys, though extremely delicate in their infancy, become very hardy, and, if permitted, will roost on the highest trees, in the cold dry nights of winter, without suffering injury. The hen, which lays many eggs early in spring, sits thirty days, and covers from twelve to fifteen eggs. It is unnecessary for the turkey cock, as is the case with gallinaceous fowl, to be in constant intercourse with the hen during her period of laying. Two visits from him in that season are sufficient to impregnate all the eggs. She is a very steady sitter, and must be removed to her food and supplied with water, for she would never leave her nest. She wants the alertness and courage and sagacity of the common hen, and might be called a fool with much more propriety than the goose, which is an intelligent bird. The turkey hen is incapable of teaching her young ones how to pick up their food, on which account a poultry-maid should always attend them until they are reared.

'The author of "Tabella Cibaria" proves it upon the bird that it is "so stupid or timorous that if you balance a bit of straw on his head, or draw a line of chalk on the ground from his beak, he fancies himself loaded, or so bound that he will remain in the same position till hunger forces him to move. We made the experiment." We never did; but we doubt it not, though we cannot accept it as proof of stupidity. How much wit may be necessary to balance a straw may be doubtful; but gallant chanticleer has never been charged either with fear or folly, and yet you have only to take him from his perch, place him on the table by candle-light, hold his beak down to the table, and draw a line with chalk from it, so as to catch his eye, and there the bird will remain spell-bound, till a bystander, rubbing out the line, or diverting his attention from it, breaks the charm. Many a fowl have we fascinated in our boyish days.'†

On account of the constitutional delicacy of this bird, the hatching should not be commenced too early in the spring, and when the chicks are hatched they should be guarded from the extremes of heat and cold for some weeks. Rain is almost always fatal to them in their early stage. Curd, boiled eggs, and barley or oat meal, kneaded with milk (or water, in case milk should produce looseness), potatoes, nettles, parsley, Swedish turnips, with chopped beet-leaves, after a little time, is their proper food. As they retain so much of their original wild nature as to stray a considerable distance, if permitted, the hen should be tied or cooped for at least six weeks, when the chicks will be hardy enough to follow her about, under the vigilant eye however of the poultry-maid, who should beware of their being caught by a shower.

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* For a most lively and interesting account of this bird, we would refer the reader to 'Ornithological Biography,' by an American, London, 1831.

† Ibid.

They are soon familiarised to the society of fowls in the poultry or farm yard. Without the advantage of the latter, it is an unprofitable speculation to rear any description of poultry on a large scale; but where a farmer's yard presents facilities, the economy of having all those kinds to which the soil and climate are suitable, is considerable. The only caution with regard to turkeys, where gallinaceous birds are numerous, is to have separate houses for them at night. These should be very lofty and well ventilated. They may be altogether open to the air in front, the doors being of trellis-work. Fowls (which are equally unsocial with the capons of their own kind) have a strong disinclination to roost with them

When well grown, turkeys supply themselves in their ramblings so far as to require food only when leaving their house in the morning and returning at night. The chances of rearing a second brood are not so great as to render it expedient to make the trial.

After six months turkeys may be crammed like fowls, but they require a much longer period to render them fully fat. Those great birds which are sent to the London market about Christmas, principally from Norfolk, frequently weighing from twenty to twenty-five pounds, are usually cocks from the preceding year.

Great numbers of turkeys are reared in Ireland, where the climate is congenial to their nature, and no doubt the housewives of that country will improve in the art of fattening them, from the facilities with which poultry may now be brought to the great English markets.

Guinea Fowl.—This bird, which is not much larger than the common barn-door fowl, is of beautiful form and plumage, and though not a source of profit to the peasant who rears poultry for immediate sale, is usually kept where there is proper accommodation, as much on account of the excellence and abundance of the eggs (which, though small, are well-flavoured) as for the sake of the flesh, which is prized in the London markets when the season of pheasant-eating ceases. The number of hens allowed to the male is about the same as among the gallinaceous family. The cock, little distinguished in appearance from the female, is an attentive and affectionate mate, and even obtrusively so to his favourites, whom he will attend to the nest, and remain with until they have laid their eggs.

Retaining some of their original wildness, Guinea fowl dislike the confinement of a house. For the purpose of laying, they prefer shrubberies, clover-meadows, or corn-fields, in which they will deposit their eggs, unless closely watched. The Guinea hen is fruitful during the entire summer, but not earlier than May. On this account and the difficulty of rearing a late brood, it is more beneficial to keep her entirely for laying, and to put the earlier eggs under a common hen or capon, which will cover from twenty to twenty-five, than to encourage the incubation of the natural parent, which is moreover indisposed to it, especially if under cover. If left to her instinct, this bird would at a late season, in the open air, sit for the natural period, which is twenty-eight or twenty-nine days.

The cock having the same dislike to incubation which characterises the male of pea-fowl, will destroy the eggs if he can discover them. Though the shell is remarkably hard, the chicks break through it at the proper moment, and are soon after as vigorous and ready to eat as the young of any other tribe of poultry.

The loud cry of these birds is not agreeable, but, like the scream of the pea-fowl, it announces with certainty an approaching change of weather. The hen utters a cry when she desires to roost, to call in her companions, to summon assistance, or to give notice of any of those alarms which her sensibilities cause her to express with such energy of voice, and in all which cases she is sure of receiving a ready sympathy.

The same food which is suited to the young of gallinaceous fowls and turkeys is good for the chicks of this kind; but as they are not often destined to the coops for fattening, a good deal of garden or field green-food may be combined with their grits, &c. after the first month. They have a great relish for insects of every kind, and thrive upon them as well as upon hemp-seed. When designed for the table, they ought to be killed at an early age, at which time the flesh is more juicy than that of other poultry of the same age, and very like that of the pheasant, though when old it becomes exceedingly tough. [PAVONIDÆ.]

Ducks.—The white duck, being the largest of the common domesticated kinds, is perhaps the best for the poulterer, though it is not deemed so delicate in flavour as the dark-coloured, such as that bred from intermixture with the Rhone duck, which is also large. The Muscovy variety is said to be a good breeder. One drake is sufficient for five females. It is generally believed that the duck lays no more eggs than she can cover (from twelve to fifteen), but Mr. Moubray states that, if well fed, some ducks will lay a great number, and he gives an instance of one laying an egg every day for eighty-five days.

For a fortnight after their birth, ducklings should be kept from rushing into water, to which their instinct soon leads them; and with this view the mother is frequently confined (where there is any pond within her reach) to the *rip*, already described, which should be placed on a field of short grass with a flat dish of water near it. The ducklings waddle about in search of insects, and at the maternal call return to the coop. This restraint upon the liberty of the poor mother should be avoided if circumstances permit, for to protract her close confinement after more than four weeks sitting is a cruel restraint. It is very common to place duck-eggs under a hen, on account of her excellent qualities as a nurse.

Any kind of meal is good for ducklings at first, and this may soon be mixed with potatoes. The refuse of the kitchen will not only support but fatten them; but to have them quickly and highly fattened, they should have oatmeal made into paste. They will also devour any animal offal, and have no fastidiousness whatever. If allowed to follow a plough or attend on the gardener when his spade is at work, their greediness and activity in picking up worms are extreme; and for gobbling up snails and slugs and other such delicacies in the field or garden they are most useful, while they are at the same time putting themselves into high condition. Having no fastidiousness of appetite, they never require cramming, indeed they act as if they considered it their duty to get fat as quickly as possible, and therefore require no artificial aid.

In a poultry-yard the ducks and geese are frequently lodged on the lower floor of the fowl-houses, but it is better, if the locality will permit, to give them distinct chambers, particularly where a good pond (free from eels) is available; on the margin of this their huts may be placed with very trifling labour, and an invisible paling* all round the water, constructed at bottom on the principle of the cage-trap, so as to prevent the ingress of rats or weasels, while it affords them a ready outlet, renders this department of the poultry establishment complete, though far too expensive for common adoption.

'Many families in Bucks derive a comfortable living from breeding and rearing ducks, the greater part of which, the early ones at all events, are actually brought up by hand. The interior of the cottages of those who follow the occupation presents a very curious appearance to the stranger, being furnished with boxes, pens, &c., arranged round the walls for the protection of the tender charge of the good wife, whose whole time and attention are taken up with this branch of domestic economy.'†

Geese.—The proportion of females to the males is the same as in the duck tribe, and the period of incubation and the number of eggs that may be set correspond exactly. The goose lays in a mild spring very early, and on this account (but only with high corn-feeding in the previous winter, and stimulating food during the entire breeding season) two broods may be had in the same year. Unlike the peacock and the Guinea cock, the gander is not only indisposed to do any mischief to the nests, but is very attentive to the hatching birds, whom he vigilantly protects as he sits patiently by; nor is his protection, as he accompanies the young gulls in due course, less creditable to his paternal character. The goose is a very steady sitter, but usually rises often enough to drink and take sustenance, without its being necessary to remove her from her nest for the purpose.

The early treatment of the gulls or goslings is similar to that of ducklings. The mother should be penned up for some days upon dry grass, but neither too early nor very late in the day; beet leaves or other green food may be mixed even with the early diet, if immediate fattening be not the object.

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* Such may be seen at the Zoological Garden in the Regent's Park, London.

† Moubray.

Green geese are brought very early to the London market, and are worth at first from 8*s.* to 12*s.* each: they can be made quite fat with oat-meal and peas, and skimmed milk or butter-milk, when from four to six months old: many prefer oats alone.

The management of them in the vicinity of London is thus detailed in a communication to Mr. Moubray:—

'Cleanliness, punctuality, and regularity prevail; the business is conducted, as it were, by machinery, rivalling the vibrations of the pendulum in uniformity of movement. The grand object of preparing, not geese only, but poultry in general, for market, in as short a time as possible, is effected solely by paying unremitting attention to their wants; in keeping them thoroughly clean; in supplying them with proper food (dry, soft, and green), water, exercise ground, &c. On arriving at the feeders, they are classed according to condition, &c.: they soon become reconciled to their new abode and to each other. They are fed three times a day; and it is truly astonishing how soon they acquire the knowledge of the precise time; marching from the exercise-ground to the pens like soldiers in close column. Goslings, or young geese, come to hand generally about the month of March, after which a regular and constant supply arrives weekly throughout the season. At first they are fed on soft meat, consisting of prime barley or oat meal, afterwards on dry corn. An idea prevails with many that any sort of corn will do for poultry: this is a grand mistake. Those who feed largely know better, and invariably make it a rule to buy the best. The Messrs. Boyce of Stratford, whose pens are capable of holding the extraordinary number of four thousand geese, independent of ducks, turkeys, &c., consume twenty coombs of oats daily, exclusive of other food.'

But though green geese bring an enormous price in the spring, if thoroughly fat, farmers generally find it more profitable to feed goslings on the stubbles, where they supply themselves with the best food without cost, and become sufficiently fat at Michaelmas, when antient custom renders them a favourite dish.

> 'At Michaelmas by right divine,
> Geese are ordained to bleed at Michael's shrine.'

In the neighbourhood of the extensive commons in England great numbers of geese are kept.

> 'Nought is useless made; on the barren heath
> The shepherd tends his flock, that daily crop
> Their verdant dinner from the mossy turf
> Sufficient; after them the cackling goose,
> Close grazer, finds wherewith to ease her want.'
>
> Phillips's 'Cyder.'

But from the system pursued by the monopolising farmers of turning large flocks of sheep to consume the growing blade, the poor geese have short commons indeed, and gain little except air and exercise by their ramblings. The cottagers however supply them with the refuse of their gardens, and the goslings, when the harvest comes in, are bought up by the farmers, and fattened on their stubbles.

Though young geese are subject to a disease called the cramp, the greater number of those which die in summer are destroyed by starvation, and the change from corn, and other nutritive food, to the miserable herbage which the fields and commons yield; and this constitutes their chief diet until the harvest season. Cold and wet weather are often fatal to them in the earlier months, if they be neglected. Much mortality also prevails amongst grown geese, wherever the horrible system of plucking them alive prevails, as in Lincolnshire and in Ireland.* It is generally urged in excuse for this barbarity, that feathers are most elastic and valuable before the period of moulting, and that geese have been thus treated ever since feather-beds came into fashion. The offence carries some punishment with it; for it renders the flesh very tough, and in many respects deteriorates the value of a bird, if it does not destroy it altogether; but the immediate gain from the feathers counterbalances this and every humane consideration.

The cramming system is practised in France, when the object is to render the liver unnaturally enlarged by disease, with circumstances of great cruelty. We do not intend to give any information upon practices which we cannot recommend, and which we strongly condemn.

Eggs.—The most certain way of preserving eggs fresh is by greasing them with some unctuous matter, or immersing them in a strong solution of lime. In packing, they should be laid on end; for otherwise the yolks, preserving their centre of gravity, fall to the lowest side, and by adhesion to it become tainted sooner than if they were suspended in the centre.

The only management, besides warmth and high feeding, by which a perpetual succession of eggs can be obtained in winter, is by having pullets and hens of different ages, which, moulting at different periods, are not all incapacitated from laying contemporaneously.

POUND. [STANDARDS OF WEIGHT.]

POUSSIN, NICHOLAS, was born at Andely in Normandy, in 1594. He was descended of a noble family, but reduced in fortune by the part they had taken in the civil wars. Evincing an early inclination for drawing, he formed an acquaintance with an artist named Quentin Varin, and obtained his father's consent to adopt painting as a profession, of which Varin taught him the rudiments. At 18 he visited Paris, and received lessons from Ferdinand Elle, a Flemish portrait-painter, but in a few months quitted him, having already outstripped his capability of instruction. He now applied himself to the study of composition, in which he made great progress by an attentive consideration of some prints after Raffaelle and Giulio Romano, and careful copies from casts from the antique. Some of his earliest efforts in painting were the pictures in the church of the Capuchins at Blois, and some Bacchanalian subjects for the château of Chiverny. At Paris he became acquainted with Marino, the Italian poet, who invited him to Rome, but being at that time engaged on the picture of the Death of the Virgin, he was compelled to decline the invitation; in 1624 however he was enabled to undertake the journey. His friend received him with kindness, and introduced him to the notice of the cardinal Barberini, nephew of pope Urban VIII.; but that dignitary being sent on a legation to France and Spain, and Marino soon after dying, Poussin found himself deprived of the support that he expected in a foreign city, and without the means of subsistence other than by the exercise of his art. To supply his wants, he painted many pictures which he sold for scarcely more than the money they cost for canvas and colour, and two battle-pieces in particular only produced him fourteen crowns the pair. He formed an intimacy with Francis du Quesnoy, the sculptor, called Il Fiammingo, with whom he lodged, and together with that eminent man he studied and made models after the most celebrated statues and bas-reliefs. The works of Raffaelle were however the greatest attraction to Poussin, and he studied them with intense devotion.

On the return of the cardinal Barberini to Rome, he liberally patronised Poussin, who painted for him his celebrated picture of the Death of Germanicus, and the taking of Jerusalem by the emperor Titus. His patron also procured for him the commission to paint a large picture of the Martyrdom of St. Erasmus, for St. Peter's, which is now in the pontifical palace of Monte Cavello. These productions established his reputation, and recommended him to the friendship of the Cavaliere del Pozzo, for whom he painted his first series of the Seven Sacraments of the Church of Rome, which were afterwards brought to England, and are now in the possession of the Duke of Rutland, at Belvoir Castle, but one of them was unfortunately destroyed in the fire which occurred there in 1816. He afterwards painted another set of the Sacraments, executed in 1644 and 1647, with variations, for M. de Chantelou, which were among the principal attractions of the Orleans collection, and were purchased by the late Duke of Bridgewater for 4900 guineas, and now are in the collection of Lord Francis Egerton.

The celebrity which Poussin had now attained induced Louis XIII., in 1639, to desire his return to France, which took place in the following year, when he was appointed principal painter to the king, and had apartments assigned him in the Tuileries. He was commissioned to paint an altar-piece for the chapel of St. Germain-en-Laye, where he produced his admirable work of the Last Supper, and was engaged to decorate the gallery of the Louvre, for which he had prepared the designs and some of the cartoons, representing the Labours of Hercules, when the criticisms of his brother-artists excited his disgust, and determined him to depart again to Rome, to obtain leave to do which he feigned a desire to settle some private matters and to fetch his wife to France. He quitted that country in 1642, with a determination, which he adhered to, never to return. He resided in Rome, passing his time in diligent practice of his art, and in the strictest simplicity and privacy of living, until the year 1665, when he died, in the seventy-first year of his age.

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* See Doyle's *Cyclopædia of Practical Husbandry*, page 395.

Speaking of the style of this eminent painter, Mr. Fuseli observes, 'Though Poussin abstracted the theory of his proportions from the antique, he is seldom uniform and pure in his style of design; ideal only in parts, and oftener so in female than in male characters, he supplies, like Pietro Testa, antique heads and torsos with limbs and extremities transcribed from the model. As a colourist he was extremely unequal. Into the Deluge, and the Plague of the Philistines, he transfused the very hues of the elements whose ravages he represented, whilst numbers of his other pictures are deformed by crudity and patches. The excellence of Poussin in landscape is universally allowed, and when it is the chief object of his picture, precludes all censure; but considered as the scene or background of an historical subject, the care with which he executed it, the predilection which he had for it, often made him give it an importance which it ought not to have; it divides our attention, and from an accessory, becomes a principal part.'

Poussin was a profound admirer of the antique, and his mind seems to have been strongly imbued with a veneration for classic forms. No painter amongst the moderns appears to have so greatly excited his admiration as Raffaelle. In the sublimity of his conceptions, he is in some instances little inferior to that great master, nor is he much less so in the beauty of his female forms, the grace and dignity of his attitudes, and his admirable expression of the passions. His compositions evidence an intimate acquaintance with the true principles of art. They are simple, grand, and impressive; whilst his draperies are disposed with classical grace and his costumes rigidly correct.

(Bryan's *Dictionary*; 'Note,' by Fuseli, to Pilkington's *Dictionary*; *Biographie Universelle*.)

POUSSIN, GASPAR, was born at Rome, in 1613. His family was originally French, and bore the name of Dughet, but his father had settled at Rome, and Nicholas Poussin having married his sister, he acquired the appellation of Gaspar Poussin. He studied under his brother-in-law, by whose advice he adopted landscape painting, and soon became one of the most celebrated practitioners in that branch of art. His early works are somewhat hard, but a contemplation of the pictures of Claude induced him to adopt a more mellow effect. He is said to have acquired such a facility of execution, that he could paint a large landscape in a single day. His pictures represent the most interesting prospects in the vicinity of Rome, Tivoli, and Frascati. His touch is firm and vigorous, and the foliage of each tree and plant bears the peculiar character of its species. The massing of his pictures is simple and grand, and the management of the chiaroscuro very fine. Every variety of effect may be discovered in his works, from the utmost serenity to the most terrific convulsions of nature, and each appropriately treated. His pictures are sometimes embellished with figures by Nicholas Poussin, usually representing some subject of history or fable. There are a few slight but masterly etchings by this great artist; they are a set of four circular landscapes, and a set of four landscapes lengthways. He died at Rome, in 1675. He had a brother John Dughet, called also Poussin, born in Rome about 1614, who was an engraver, but of little note. (Bryan's *Dictionary*; *Biographie Universelle*.)

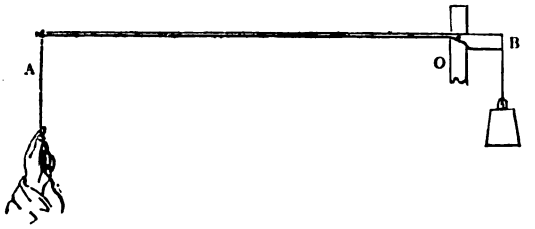
POWER (Mechanics). The present article is not intended to enter deeply into the subject, but only to remove various fallacies connected with the use of the word power, which frequently perplex and confuse those who attempt to study mechanics without the aid of mathematics.

The word power has obtained a technical meaning which seems to be almost peculiar to the popular treatises. From among the numerous combinations which occur in machinery, the lever, inclined plane, wheel and axle, pulley, and screw have been selected, and named mechanical powers. Some have treated these as all different principles; some have asserted that they are reducible to the lever and inclined plane, others to the lever only: but it is generally asserted that all mechanical contrivance is reducible to one or other of these. To which of them the very powerful machine (in its way) which men call a cannon is to be referred we do not know, not seeing any great likeness in it either to a lever, inclined plane, wheel and axle, pulley, or screw. Again, the notions of the theories of these powers are as various as those of their arrangement: some say that all are creators of power, some that all are powers except the simple pulley, some that none are powers, some that they are losses of power. Those who deny that any of the adaptations above mentioned give power, look for their meaning of the word in the action of what are thence called agents, as in the muscular strength of men and animals, the force of wind, the fall of water, the expansion of steam or explosive gases, &c. Admitting that all these agents are well entitled to the name of powers, it is nevertheless difficult to refuse that name to a machine. Watch the effect of a large crane in unloading a vessel, compare it with what the same men could do by their unaided (or rather, unadapted) strength in the same time, and it will be impossible to deny that the machine gives power.

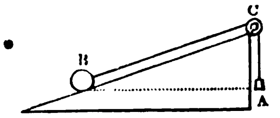
The cause of all this confusion and diversity of opinion as to the way of stating facts which every one knows, arises from the word power being taken in two different senses, that which is true of one of its meanings being untrue of another. In the first sense, power is gained whenever any thing is done quicker or better at the same expense, or in as effective a manner at less expense; whenever the advantage gained, or the disadvantage avoided, is worth more than the trouble and cost of the means employed. In the second sense, power is gained when a new adaptation is introduced, by which an existing agent is made apparently stronger. To find different phrases for these different things, let us say that power in the first sense means that which produces beneficial effect, and that power in the second sense means that which produces mechanical advantage: these last words have been often used by writers in the same sense as the technical word power.

Beneficial effect may be produced in various ways, without mechanical advantage, but the benefit, as far as it is of a physical character, will generally be found to consist in a saving of useless labour. Thus, in the division of labour, than which nothing produces more of beneficial effect, there is not only the moral benefit, namely, the making the human agent fitter for his work by giving him a more limited range of occupations, but the actual saving of the labour of laying down one tool and taking up another. Again, when loaded carriages are dismissed down an inclined plane and made to draw up the empty ones, there is no gain in a mechanical point of view, for the momentum which is gained by the empty carriages is lost by the loaded ones; but the momentum lost by the loaded carriages is no loss, since there is no use in their delivering their contents with a great velocity, while the momentum abstracted is applied to a beneficial purpose. Thirdly, a simple pulley gives no mechanical advantage whatever, since the weight on one side, when the pulley is at rest, must be equal to that on the other. If however we compare the effect of this machine in raising weights with the carriage of them up a ladder, we see at once a beneficial effect, amounting to a saving of the greater part of the labour. With a pulley, the labourer has not to carry himself up to the height required and down again. Fourthly, when the traces by which horses draw are inclined at a proper angle, a part of the drawing power is taken off, and applied in lifting the carriage off the road and lessening the friction, so that the diminished draught is better able to do the remaining work than if the whole draught were applied to the whole friction. Here is no gain of power in the mechanical sense, though the alteration is certainly a double gain (no matter how slight a one) of beneficial effect, for the carriage is more easily drawn and the road is less worn. Numberless instances might be cited in which real benefit is a consequence of mere adaptation, even without the production of what is called power in treatises on mechanics.

In treating of the second meaning of the word power, or its synonym, mechanical advantage, we must separately consider a machine just balanced, and one in which an additional force applied gives motion. Suppose a lever, one arm of which OA is ten times as long as the other OB, and suppose that the arms balance each other. A pull of one pound at A will then support (so it seems) ten pounds at B, for the first will certainly equilibrate the second, or prevent motion. Nevertheless, it is not true that one pound supports ten pounds; nor can one pound, by any contrivance whatsoever, be made to support more than one pound. In the case before us, A acts against one pound, but not one pound of B; it is A and B together, eleven pounds in all, which oppose a resistance of eleven pounds offered by the support or pivot O. The weight B is equivalent to two pressures, one downwards, at O, of eleven pounds, one upwards, at A, of one pound. The frame on which the pivot rests neutralises the first, the pull at A neutralises the second. To say that A supports B, would be an assertion like that of a person who should say that he had paid 11*l.* with 1*l.*, and should forget that he had borrowed 10*l.* elsewhere; and in the above system there is neither gain nor loss of force in any manner. When the weight B is lifted from the ground, and attached to the end of the lever, and when at the same moment the hand was applied at A, there is a pressure of eleven pounds applied to the earth at O. But all this pressure was first taken from the earth, ten pounds of it by the removal of the weight B, and the remaining pound by diminution of the weight of the person pulling; for a person who pulls downwards at a rope in such a manner as to supply the place of a pound weight at the end of the rope, lessens his weight by one pound.



In the preceding manner it may be shown that every machine in which A, the less, balances B, the greater, is a case of the following kind:—B is equivalent to certain forces, P, Q, R, &c., applied at various points of the system, and to C, equal and opposite to A. Imagine P, Q, R, &c. and C substituted for B, then P, Q, R, &c. are counterbalanced by the resistance of the parts of the machine, and C, and C only, is counterbalanced by A. It may also be shown that the whole pressure upon the earth is just what it would be if the machine were dismantled, and its parts, together with the weights, laid upon the ground.



Let us now consider the machine in motion. The paradox about power here is, that the smaller weight is made to lift the greater; for example, that a pressure, say of one pound, applied to the handle of a crane, lifts a weight of say twenty pounds. As long as no more precise mode of expression is employed, the paradox continues:—the smaller weight *does* lift the greater. To take the simplest case, suppose that the descent of a smaller weight causes the ascent of a greater, as in an inclined plane with a pulley. It is now obvious that before the larger weight B can rise through AC, the smaller weight A must fall through a length equal to BC. In any machine in which the hand, exerting a pressure of one pound, balances a weight of twenty pounds, the hand, when put in motion to raise the weight, will move twenty times as fast as the weight. It is then one pound moved through twenty feet, which is mechanically equivalent to twenty pounds moved through one foot, and the paradox disappears. It is usual to express this by saying that what is gained in power is lost in time; but instead of this axiom, which only indirectly expresses the truth, it is better to say that a less weight cannot cause the ascent of a greater through a given height, without descending through a height greater in the same proportion as that by which the greater weight exceeds the less. Perhaps the easiest mode of balancing the power applied and the work done is as follows:—Suppose one pound descending through four feet raises four pounds through one foot, we have then applied the descent of one pound through one foot four times, and produced the ascent of one pound through one foot four times. The only difference is, that in the applied power it is the same pound which moves over four different feet, while in the produced effect there are four different pounds moving over the same foot. The machine is nothing but an adaptation which enables the agent to effect the exchange just mentioned. And though the common notion that a machine gives power usually has reference to the substitution of greater weight with less velocity for a smaller weight with greater velocity, yet it frequently happens that the apparent power is gained by the contrary exchange, as in the common grinding-wheel and in the lathe. Frequently also the beneficial effect arises from a reservoir of power which is given out in small quantities, as in a clock or watch, in which the exertion of raising a weight or coiling a spring is expended in minute quantities over one or more days.

Without entering further into the preceding principle (for which, in its mathematical bearing, see Virtual Velocities), we will now touch upon some additional circumstances connected with the use of a machine, still confining ourselves to simple exposition of these circumstances, and avoiding mathematical explanation. Suppose a crane by which a man, with a certain amount of labour, raises five hundredweight through a height of ten feet, working all the while as if he were raising half a hundredweight, by a simple pulley, from the deck of a vessel to the wharf. If this five hundredweight were divided into ten portions of half a hundredweight each, and if each of these portions had a rope fastened to it, it would matter nothing, the manner of working being equally convenient in both cases, whether he raised the whole at once by the crane, or the ten portions in succession by their several ropes. This supposes that there is no friction in the parts of the crane, and that its wheels can be moved without any exertion when unloaded. Neither of these is true, for the friction of the loaded machine is considerable, and even the unloaded machine costs some exertion to set it and keep it in motion. So far then the balance is in favour of raising the ten subdivisions of the five hundredweight in succession; and we now see what those persons mean who say that a machine is a loss of power. But if we introduce the beneficial effect produced by the machine, we see that the subdivision of the weight is avoided, and that the labour thereby saved may be thousands or even millions of times that caused by the friction of the machine and the necessity of moving its wheels, &c. A little attention to such considerations as the preceding will prevent the reader, however unpractised in mechanical considerations, from being led away by accounts of perpetual motion [Motion] and of machines which are to work without power applied.

The muscular power of men and animals, the force of wind, the fall of water, the expansive power of steam, &c. are real powers, the explanations of which lie in the secrets of the laws of life, gravitation, and chemistry. A machine is an adaptation of material elements to one or more purposes, the life of which is one or other of the powers just mentioned. But nothing is more common than, in describing the wonderful effects of power and adaptation united, to lay the wonder on the wrong part. Thus we can imagine a person describing the progress of mechanics in the last century, by saying that 'lace is made by steam, and mines which would be covered with water but for the application of science, are cleared for the miners by machinery.' In the first instance the steam-power is but subordinate; horses or a water-mill might supply its place without any diminution of the extraordinary part, which is the adaptation of machinery to the performance of that which required so many and varied motions of the fingers. In the second instance, common pumps, or successions of them, would do as well as the machinery employed, if hands enough could be found to work them: the wonder is the introduction of labour to any amount by the help of steam. The vulgar notion is that steam, as steam, can adapt itself to anything, and that machinery, as machinery, can work.

POWER (Algebra). [Root.]

POWER OF ATTORNEY. [Letter of Attorney.]

POWERS (Law). [Uses.]

POWNALL, THOMAS, was born at Lincoln, in 1722. He went to America in 1753, and was elected governor of the colony of Massachusetts Bay in 1757. In 1759 he was appointed governor of New Jersey, and soon afterwards proceeded to South Carolina as governor and captain-general. Having solicited his recal, he returned to England in 1761. In 1768 he was elected a member of the House of Commons, and spoke frequently against the war with America. He retired to Bath in 1780, where he died in 1805.

Pownall was a fellow of the Royal Society, and of the Society of Antiquaries. He was the author of a few works, of many pamphlets, chiefly antiquarian and political, and of several papers in the 'Archæologia.' Among his more important works may be mentioned his 'Notices and Descriptions of the Antiquities of Provincia Romana of Gaul,' London, 1788, 4to.; and his 'Intellectual Physics, an Essay concerning the Nature of Being,' 1803, 4to. A full list of his productions is given in Watt's 'Bibliotheca Britannica.' (*Encyclopædia Americana; Biog. des Contemporains.*)

POYNING'S LAW. [IRELAND.]

POZZUO'LI, *Púteoli* (Ποτίολοι, Strabo), an antient town of Campania, situated on the eastern shore of the gulf of Baiæ, five miles west of Naples, from which it is separated by the hill of Posilipo, through which a tunnel was excavated in antient times. [POSILIPO.] Pozzuoli lies at the foot of the volcanic hill called La Solfatara, and on the western side of it is another volcanic hill called Monte Nuovo, which was thrown up in one night, in September, 1538, on the site of the Lucrine lake. [PHLEGRÆI CAMPI.] Pozzuoli was a colony of Cumæ, of which it was the port, and was then called Dicæarchia. It afterwards became allied to Rome, to which it remained faithful in the midst of the general defection of the towns of Campania during the second Punic war. Hannibal tried in vain to surprise it. (Livy, xxiv. 13.) A Roman colony (Civium Romanorum) was sent to Puteoli, after the close of the second Punic war, in B.C. 194. (Livy, xxxiv. 45.) The Romans gave it the name of Puteoli from 'putei,' the wells, or, as others say, from 'putor,' the stench of its springs, which are impregnated with sulphur. (Strabo, p. 245.) Puteoli was a flourishing place under the Romans, being resorted to by the wealthy for the sake of its situation and its mineral springs. It is now a decayed town, with about 10,000 inhabitants, and is a bishop's see. The air of Pozzuoli, and especially of the country around it, is considered unwholesome in the summer months. The remains of antiquity at Pozzuoli attract numerous travellers. The temple of Jupiter Serapis is now cleared of the rubbish which had encumbered it for ages; three columns are still standing, and the pedestals of others, and there is a handsome pavement of white marble. Near it is a number of cells and a bath, supposed to have been for the use of the priests. The amphitheatre is in great measure ruined and encumbered with rubbish and soil, but part of the walls and arches are cleared. There are also remaining several piers of the antient mole, which was built on arches like a bridge, so as to allow free ingress and egress to the sea, through the passages: this was done to prevent the accumulation of sand, which is apt to take place in those harbours which are confined by solid continuous moles. It was to the end of the mole of Pozzuoli that Caligula attached a floating bridge, which is said to have reached the opposite coast of Baiæ, a distance of about two miles in a straight line, though Suetonius calls it more than three. (Suetonius, *Caligula*, 19.) The cathedral is built on the ruins of an antient temple, the materials of which have been employed in its construction. There is also a subterraneous construction called the Labyrinth, or 'Cento Camerelle,' which appears to have been a water reservoir. [BAIÆ.]

In the country around Pozzuoli is found a kind of reddish earth called Pozzolana, which, being mixed with lime and water, forms an excellent cement, that becomes in time as hard as marble, even when immersed in the water of the sea. It is found also at the foot of Vesuvius, where it is of a greyish colour, but is equally good. (Vitruvius, *De Archit.*, 11, 6.) The old moles of Puteoli were made by throwing masses of this compound into the sea, and thus this open shore was furnished with a harbour capable of containing the largest trading ships. (Strabo, p. 245.)

POZZUO'LO. [NOVI.]

PRACTICE, a rule of arithmetic, appropriately so termed because it hardly contains any new principle, but depends for its application upon the memory and dexterity which the operator acquires from practice. Thus in the following simple question, 'How much do forty yards cost at eighteen pence a yard,' some arithmeticians (unpractised) might find it necessary to multiply 40 by 18 and divide the result by 12, for the number of shillings in the answer: but a practised arithmetician would immediately see that 18*d.* is a shilling and a half, so that 40 shillings must be allowed for the shilling, and 20 shillings for the half shilling, making altogether 60 shillings. More complicated examples may require greater subdivision, but the method of proceeding has been completely described in the preceding. Suppose for instance it is required to find the price of 253¼ yards at 2*l.* 13*s.* 7¾*d.* a yard. The application of the rule of practice is as follows:—

At 1*l.* pr. yd. 253¼ yds. cost	£253	5	0	
			2	
2*l.* is 2 × 1*l.* .	506	10	0	
10*s.* is ½ of 1*l.* .	126	12	6	
2*s.* is ⅕ of 10*s.* .	25	6	6	
1*s.* is ½ of 2*s.* .	12	13	3	
6*d.* is ½ of 1*s.* .	6	6	7½	
1½*d.* is ¼ of 6*d.* .	1	11	7¾	½
¼ is ⅙ of 1½*d.* .		5	3¼	¼
At 2*l.* 13*s.* 7¾*d.* pr. yd. 253¼ yds. cost	679	5	9½	¾

The process hardly needs more description than is given on the left; the only difficulty is the division of the price into portions each of which is a simple aliquot part of one of the preceding, and this difficulty is to be overcome by practice. It is also to be noticed that easy verifications often occur; thus in the last process but one, it can easily be verified that 253¼ farthings is 5*s.* 3¼*d.* ¼.

When both the factors which are to be multiplied contain complicated fractions, this rule can be easily applied by turning the money factor into pounds and decimals of a pound, as in INTEREST. Thus suppose it is required to find the price of 22 ton 17 cwt. 1 qr. 19 lb., at 13*l.* 16*s.* 4*d.* a ton, or 13·81667*l.* We have then

1 ton	costs	£13·81667
		22
22 ton	„	303·96674
10 cwt. is ½ of 1 ton		6·90833
5 cwt. is ½ of 10 cwt.		3·45417
2 cwt. is ⅕ of 10 cwt.		1·38167
1 qr. is ⅛ of 2 cwt.		·17271
14 lb. is ½ of 1 qr.		·08636
4 lb. is ⅐ of 1 qr.		·02467
1 lb. is ¼ of 4 lb.		·00617
22 ton 17 cwt. 1 qr. 19 lb.	cost	£316·00082

So that the proper answer is less than a farthing above 316*l.* The preceding process is much shorter than the application of the rule of three, and also than a kind of double rule of practice once in use, which is not given in modern works, and is not worth revival.

This method of practice is also a convenient way of reducing fractions of weights or measures to decimals. Thus if 17 cwt. 1 qr. 19 lb. is to be reduced to a decimal fraction of a ton, we have

1 cwt. is	·05	of a tou.
17 cwt. is	·85	. .
1 qr. is ¼ of 1 cwt. or	·0125	. .
14 lb. is ½ of 1 qr. or	·00625	. .
4 lb. is ⅐ of 1 qr. or	·0017857	. . .
1 lb. is ¼ of 4 lb. or	·0004464	. . .
17 cwt. 1 qr. 19 lb. is	·8709821	of a ton.

PRÆFECTUS URBI (prefect or warden of the city) was the title of a Roman magistrate. The office was said to have been instituted by Romulus (Tacit., *Annal.*, vi. 11) to supply the place of the kings in their absence from Rome. Within the walls of the city he was for a time invested with kingly power: he had the administration of justice, and on any sudden emergency he took such measures as he thought necessary; in short, he had the imperium in urbe. (Livy i. 59.) He was appointed from among the senators. (Dionys., ii. 12.) Whether on the return of the king he laid down his title with his office, is uncertain. During the time of the republic the præfectus urbi was appointed by the consuls or by the senate (Dionys., viii. 64), when the consuls were obliged to be absent from the city. In the early times of the republic he was generally a consular. During the time of his office he exercised in the city the power of the consuls (consulare munus usurpabat): he had the right to convoke the senate (Varro, *Ap. Gell.*, xiv. 7, comp. with xv. 8), and to hold the comitia (Liv., i. 60). But in the course of time the prefect of the city was superseded by the prætor urbanus, on which the former magistrate became merely a shadow (simulacrum) of what he had been, and was appointed while the consuls were absent from Rome for the purpose of celebrating the Feriæ Latinæ. This office, being of no importance, was often filled by young men, and Julius Cæsar even appointed several youths under age as prefects of the city. (Tacit., l. c., iv. 36; Dion Cass., xlix., p. 476.) This shadow of a magistrate seems to have continued to be appointed during the Feriæ Latinæ, even after Augustus had made a permanent præfectus urbi. (Suet., *Nero*, 7.) Augustus invested this new prefect with considerable power, gave him the superintendence of public works, roads, and aqueducts, of all things connected with the navigation of the river, and of the corn to be distributed among the people. (Suet., *Octav.*, 37; Tacit., l. c.; Dion Cass., lii., p. 547.) This præfectus urbi was generally taken from the consulars and the most distinguished men of the state. He was also invested with jurisdiction over slaves and turbulent citizens. He was thus something like a chief officer of the police; but his powers became gradually more and more extensive, so that almost all the powers formerly belonging to the office of prætor urbanus in the end were transferred to the præfectus urbi (*Dig.* i., t. 12; *De Off. Præf. Urbi*, comp. with Tacit., *Annal.*, xiv. 41); and from the beginning of the third century he not only exercised the inferior but also the criminal jurisdiction, and that not only in the city, but at the distance of one hundred miles from it. During the early period of the empire the prefect of the city seems always to have held his office for a number of years, but from the time of Valerian we find a new prefect almost every year. Respecting the titles by which he was addressed, see Brisson, *De Form.*, p. 296. At the time when Constantinople was raised to the rank of the second capital of the empire, it also received a prefect of the city, who, like the prefect in the west, was the direct representative of the emperor, and next to him the first person in the city. The whole administration of the city, all its corporations and institutions were under his superintendence; every month he made a report to the emperor of the transactions of the senate and people (Symmach., *Epist.*, x. 44); in the assemblies of the senate he gave his vote before the consulars (Cassiod., *Variar.*, vi. 4), and was the medium through which the emperors communicated with the city.

PRÆMUNI'RE (used for *præmonere*, 'to forewarn,' Co. Lit., 129 b) is the first word of an antient writ by which a party was summoned before the king to answer a charge of contempt against him. The commencement of the writ was as follows: 'Præmunire facias A. B. quod sit coram nobis,' &c. The contempt consisted in the doing of some act in derogation of the allegiance due to the king. In case of conviction, the judgment was, that the defendant (who had committed the offence of throwing off his allegiance) should be thenceforth out of the king's protection, and his lands and tenements, goods and chattels, forfeited to the king, and his body should remain in prison at the king's pleasure. The word præmunire, as now used, has two meanings; one the writ itself, the other the offence to which the writ is applicable.

In late times it seems to have been considered that the offence was referrible only to attempts to introduce the papal authority into this kingdom; but it would appear that any attempt to introduce foreign jurisdiction or usurp upon the 'kingly lawes of the crown' was equally within the penalties of a præmunire. It is true that most of these attempts did relate to the papal jurisdiction, and the statute 16 Rich. II., c. 5, called the statute of præmunire, relates only to such attempts. But the statute 27 Edw. III., c. 1, referred to by 16 Rich. II., c. 5, visits an analogous offence with the same penalty where one 'shall draw any out of the realm in plea whereof the cognizance pertaineth to the king's courts, or whereof judgment is given in the king's courts, or which do sue in any other court to defeat or impeach the judgment given in the king's court, &c.;' and this applied even where the other court was within the realm, as by suing in chancery to defeat a judgment at common law, or suing before other courts, such as the ecclesiastical, admiralty, &c., in matters whereof the king's court had jurisdiction. These were offences also punishable at common law. (See also 35 Edw. I., 2, 3.)

Numerous statutes have defined what shall be such a contempt as amounts to a præmunire. Most of the earlier are directed against *provisors*, as they were called, or persons who purchased from the court of Rome provisions for holding abbeys or priories, &c., before those benefices were vacant (25 Edw. III., stat. 5, c. 22, stat. 6), or for exemption from obedience to their proper ordinary (2 Henry IV., c. 3), or bulls for exemption from tithes (2 Henry IV., c. 4), or those who held benefices in favour of aliens, &c. (3 Rich. II., c. 3; 7 Rich. II., c. 12; 12 Rich. II., c. 15; 13 Rich. II., stat. 2, c. 2), or those who purchased (procured) bulls, sentences of excommunication, &c. against the king (16 Rich. II., c. 5). This statute recites that 'so the crown of England, which hath been so free at all times that it hath been in no earthly subjection, but immediately subject to God in all things touching the regalty of the same crown, and to none other, should be submitted to the pope, and the laws and statutes of the realm by him defeated and avoided at his will, in perpetual destruction of the sovereignty of the king our lord, his crown, his regalty, and of all his realm, which God defend.' During the time of Henry VIII., several statutes applied the penalties of a præmunire to those who sued for or attempted to enforce any bull, &c. from Rome, or appealed there (23, c. 2; 24, c. 12; 25, c. 19, 21; 28, c. 16), or refused to elect a bishop named by the king (25, c. 20). By 5 Eliz., c. 1; 13, c. 2; 27, c. 2, it was applied to those who refused to take the oath of supremacy, or defended the pope's jurisdiction, abetted publishers of bulls, &c., or sent relief to Jesuits beyond seas.

About this time the penalties of a præmunire ceased to be confined to the class of offences already enumerated. The following enactments however related solely to such offences: 13 Ch. II., s. 1, c. 1, whereby persons who advisedly assert that both or either house of parliament have a legislative authority without the king: 4 Jac. I., c. 4; 1 W. & M., s. 1, c. 8, those who refuse to take the oath of allegiance are declared guilty of a præmunire. By 7 & 8 Will. III., c. 4, serjeants, barristers, attorneys, &c. are subjected to the same penalties if they practise without taking the oath. By the 6 Anne, c. 7, a malicious or advised assertion that the then pretended prince of Wales or any person other than according to the acts of settlement and union, has any right to the throne of these kingdoms, or that the king and parliament cannot make laws to limit the descent of the crown, amounts to the same offence. And 12 Geo. III., c. 11, attaches the same penalties to all such as wilingly solemnize or assist, &c. at any forbidden marriage of the descendants of George II. who by that act are prohibited to contract marriage without consent of the crown. But during the same period the penalties of a præmunire were attached to persons guilty of various offences of very different characters: to those who molest the possessors of abbey lands granted by parliament to Henry VIII. and Edward VI.; to brokers or agents in any usurious contract where above 10 per cent. interest is taken, by 13 Eliz., c. 8; to those who obtain any stay of proceedings other than by arrest of judgment or writ of error in any suit for a monopoly, by 21 Jac. I., c. 3, s. 4; who obtain an exclusive patent for the sole making or importation of gunpowder or arms, or hinder others from importing them, by 16 Ch. I., c. 21. By 12 Ch. II., c. 24, the king's prerogative of purveyance, by which goods were formerly taken at a certain price for the king's use without the consent of the owners [Purveyance] was abolished; an action was given to parties against whom it was attempted to be enforced, and those who should attempt to delay execution in such action, save by intervention of the court in which it was pending, were subjected to the penalties of a præmunire. By the Habeas Corpus Act, 31 Ch. II., c. 2, the same punishment, besides others, is incurred by those who deprive or assist in depriving any subject of this realm of his liberty contrary to that act. By 6 Anne, c. 23, if the peers of Scotland convened to elect their representatives in the British parliament, treat of any other matter than the election, they are guilty of a præmunire. After the breaking of the South Sea bubble, those who thereafter engaged in such undertakings were, by 6 Geo. I., c. 18 (now repealed), made liable to the penalties of a præmunire.

The punishment of a præmunire has already been stated. After judgment, the defendant might formerly have been killed by any man. 'But Queene Elizabeth and her parliament, liking not the extreme and inhumane rigor of the law in that point,' made it unlawful to slay him (5 Eliz., c. 1). Still, being out of the protection of the law, he cannot sue in any action (Co. Lit., 129 b), and he forfeits all his goods and chattels, his lands and tenements in fee, and his life interest in lands in tail. (3 *Inst.*, 119, 'Of Præmunire.') Prosecutions for this offence are now almost obsolete.

PRÆNESTE. [Palestrina.]

PRÆPEDI'TUS, a name assigned by MM. Duméril and Bibron to a genus of reptiles belonging to the Saurophthalmic group of their *Lizards Scincoidiens ou Sauriens Lepidosaures*; and placed by those distinguished erpetologists next to *Scelotes*, Fitz. (*Bipes* and *Pygodactylus*, Merrem; *Bipes*, Cuv. and Gray; *Zygnis*, Wagl.). [Bipes.]

Præpeditus is the *Soridia* of Gray, whose name has the priority.

The nostrils open in the middle of a plate or scale. There are no auricular apertures, and no anterior limbs. The two posterior feet are simple stylets; the body is anguiform, and the scales are smooth.

Example, *Soridia lineata*, Gray; *Præpeditus lineatus*, Dum. and Bibr.

MM. Duméril and Bibron state that the following should be added to Mr. Gray's characters: teeth conical, simple; palate smooth; tongue arrow-headed, scaly, notched at its point—if, as they suppose, Mr. Gray's species is not different from a Cape Scincoidian which they saw in Dr. Smith's collection at Chatham; and they think that the locality (New Holland) assigned by Mr. Gray to his species is erroneous.

PRAETOR, a word which apparently contains the same elements as the verb *præire*. The consuls were originally called praetors, but the name praetor was specially appropriated to a magistrate called the praetor urbanus, who was first appointed B.C. 365. He was called a colleague of the consuls, and was created with the same auspices. (Liv., vii. 1.) The praetor was at first only chosen from the patricians, as a kind of compensation to them for admitting the plebeians to fill one of the consulships. (Liv., vi. 42.) In the year B.C. 336 the first plebeian praetor was created.

The praetor, in his origin, seems to have been a kind of third consul. While the consuls were at the head of the armies in the field, the praetor exercised the consular power within the city, in the senate, and in the comitia. He also administered justice ('jus in urbe dicebat,' Liv., vi. 42). On some occasions the praetor led the armies of the state. (Liv., vii. 23, &c.) Yet the imperium of the praetor was less than that of the consuls, to whom he owed obedience. There was also a distinction in his insignia of office, for the praetor had only six lictors, from which circumstance he is called by Polybius 'the general with six lictors' (ἡγεμὼν or στρατηγὸς ἑξαπέλεκυς, and sometimes simply ἑξαπέλεκυς, &c.). It appears from Livy that the praetorship was originally given to a consul of the preceding year; and after the plebeians obtained admission to this magistracy, it was given alternately, at least for a time, to the patrician and plebeian consul of the preceding year. As the praetor was a kind of substitute for the consuls, there was nothing in the nature of the office which limited the number: and accordingly in B.C. 247, another praetor, called Praetor Peregrinus, was created, who administered justice in matters between citizens and foreigners, and in matters between foreigners only. It is conjectured that one praetor was a patrician and the other a plebeian, but this does not appear certain. If one of the praetors left the city to command the army, the other had the authority of both within the city; and when the military service required it, the imperium of a praetor was prolonged for another year by the senate or the comitia. When conquests were made beyond the limits of Italy, and foreign countries were reduced to the form of provinces, praetors were sent to govern them. Thus two new praetors were appointed for Sicily and Sardinia (B.C. 227), and subsequently two more when the two provinces of Spain were formed. The provinces of the praetors were determined annually by the senate, and distributed among them by lot. As the judicial labours of the praetors increased, they generally spent their year of office at Rome, and then took the charge of a province with the title of propraetor. Sylla increased the number of praetors to eight. The praetor urbanus had the highest rank, and was specially called praetor: the duties of his office required his constant attendance at Rome, and he could not leave the city for more than ten days at a time. He had the troublesome and expensive duty of superintending the Ludi Apollinares and giving gladiatorial shows to the people. Julius Cæsar increased the number of praetors to ten, then to twelve, fourteen, and sixteen; Augustus reduced the number to ten, then again raised it to sixteen, and finally fixed it at twelve. Under Tiberius there were sixteen. A permanent praetor for fidei commissa was subsequently appointed (*Dig.* i., tit. 2, s. 3), and another for matters between the Fiscus and private individuals; and a praetor was appointed by the emperor M. Antoninus (Capitol. *M. Anton.*, c. 10) solely for matters relating to guardianship (tutela).

An office like the praetorship in some respects may be traced further back than the first election of a praetor; and the vicarious duties of the office appear clearly in the functions of the antient prafectus urbi [PRÆFECTUS URBI], whose office became of less importance on the appointment of the praetor urbanus. As late as the time of Cicero (*Ep. Fam.*, x. 12, xii. 28), we find the praetor performing the duties of the consuls in their absence.

The praetor urbanus became the chief magistrate for the administration of justice, and in this respect his office was the most important in the state. He was one of the magistrates who had the Jus Edicendi (Gaius, i. 2), or of publishing edicta, which were the foundation of a body of law known under the names of Jus Honorarium or Praetorium. The praetor peregrinus had also the Jus Edicendi: and the edicta of these two praetors formed the largest body of this edictal law. The edicta of the praetor urbanus were published generally on entering on his office, and occasionally during its continuance. It is difficult to describe the edicta in exact terms, but they had reference only to civil actions, and their object was generally to provide for cases unprovided for by the existing laws, and mainly by introducing new kinds of actions (actiones utiles) when the actions of the old law (actiones directae) did not apply, and fixing the mode of procedure. They often adapted a new form to an existing right, and they contrived by various legal fictions to accommodate the limited provisions of the old laws to the existing wants of society; but in all these proceedings we clearly discern a rectitude of intention and singleness of purpose as the characteristic of the edict. The praetor also interfered in a summary way by his Interdict, particularly in matters of possession [POSSESSION], in the case of a man who was of unsound mind and incompetent to manage his property, or a prodigal who was wasting his substance; in which cases the praetor appointed a curator, when the laws of the Twelve Tables had not provided for one. He also gave relief in cases of fraud whenever the law had made no provision (*Dig.* 4, tit. 3), and generally by the doli exceptio and the in integrum restitutio, in the case of minors, he set aside fraudulent transactions. (Savigny, *Von dem Schutz der Minderjährigen*, *Zeitschrift* x. 261.) It is stated that the praetors would sometimes vary their edicta in the course of the year, till this was forbidden by a decree of the senate, and finally by a lex Cornelia (B.C. 67). This gave to the edict a character of greater stability. It seems that the edicta of his predecessors, though not absolutely binding on an actual praetor, were frequently adopted by him. Indeed we cannot conceive that the prætorium jus could have acquired that stability and consistency which it undoubtedly had acquired, even in the time of Cicero (*Leg.*, i. 5), if the chief rules that were established by the praetors were not observed by their successors: The Roman jurists found ample matter for comment in the praetors' edicta, and a large part of their writings had for their object the exposition of the legal principles contained in them. Under the emperor Hadrian the edicta of the praetors were collected and arranged by Salvius Julianus, a distinguished jurist, under the name of Edictum Perpetuum, and from this time the progressive development of the Roman law by the praetors' edict ceased. The constitutions and rescripts of the emperors supplied the place of the edict.

In civil matters, except in the cases of interdicts, the praetor did not give final judgment. (Gaius, iv. 139) [INTERDICT.] A person who had a claim against another, which was disputed, applied to the praetor for the purpose of obtaining a reference of the matter in dispute to a judex or judices, with the proper instructions, which were contained in the formula. [JUDEX.] The proceedings before the praetor were *in jure*, and had reference to the pleadings and various proceedings by which the matters in dispute between the two parties were to be brought to issue.

The praetors also presided in quaestiones, or judicial inquiries into crimes, or that class of offences which were the subject of judicia publica. Sometimes persons (quaesitores or quaestores) were appointed on special occasions to preside at such trials. After the number of praetors had been increased to six, the praetor urbanus and peregrinus exercised their usual jurisdiction, and the other four presided in quæstiones as to repetundæ, peculatus, majestas, and ambitus. These quæstiones were called perpetuæ (Cic., *Brut.*, 102), apparently because the praetors exercised the functions of quaestores during the whole year of office, and not, as was the old practice, on the particular occasion only of their appointment as quaestores. Still extraordinary quaestores might be appointed. Sulla, by various leges, added to the number of quaestiones perpetuæ, and at the same time made two additional praetors.

The importance of the praetor urbanus and peregrinus must have declined after the time when their edictal power ceased to be exercised, which, as already observed, was in the time of Hadrian. (Savigny, *Von dem Schutz*, &c.) It is true that Gaius, who wrote after the time of Hadrian, seems to speak of the praetorian jus edicendi as existing in his time; and so it might in theory, though not in fact. Further, he is speaking of praetorian edicta as one of the sources of Roman law, and it was not necessary for him to define accurately the time when they had ceased to have any force, or had almost fallen into disease.

The praetors existed till a late time under the empire, and still had some jurisdiction. [Praefectus Urbi.]

PRÆTORIANS was, in the time of the Roman republic, the name of a select cohort which attended the person of the prætor or commander of a Roman army. Sallust (*Catilina*, 60) says that Petreius, finding that Catilina and his followers defended themselves more stoutly than he expected, ordered, as a last expedient, the prætorian cohort to charge the insurgents, and this decided the fate of the battle. In the time of the triumvirate, Octavian and Antony greatly increased the number of the prætorians. Appianus (*Bell. Civ.*) says that after the battle of Philippi they dismissed all those soldiers who had served their time, except 8000 men who requested to remain in the service, who were distributed in prætorian cohorts attached to the persons of the triumvirs. After the final overthrow of the republican party, Augustus formed the prætorians into nine cohorts, and fixed their station in the capital as guards to his person, (Suetonius, *August.*, 49.) They became in fact, under the emperors, what the regiments of guards or household troops are in the actual monarchies of Europe, a select and privileged body in the army. But besides their ordinary military duties, they had also the charge of state prisoners, and often acted as executioners. The prefect of the prætorium was the commander of the whole body of prætorians. They were all picked men, chosen from Old Latium, Umbria, Etruria, and the older Roman colonies, and they were proud of their origin. (Tacitus, *Annal.*, iv. 5.) Under Vitellius the prætorian cohorts were increased to sixteen. (Tacitus, *Hist.*, ii. 93.) In the frequent revolutions of the empire the prætorians acted a conspicuous part, and often determined the fate of an emperor, and the choice of another; as in later times the janissaries did with regard to the Turkish sultans. Diocletian reduced the number of the prætorians, and Constantine entirely disbanded them.

PRAGMATIC SANCTION is a term that has been used to signify a solemn ordinance or decree of the head or legislature of a state upon weighty matters. The use of it appears to have originated with the Byzantine empire. It was used in France at an early period of the monarchy. In 1268 Louis IX. issued a pragmatic sanction concerning the discipline and temporalities of the Gallican church. (Bochellus, *Decreta Ecclesiæ Gallicanæ*.) But the most celebrated pragmatic sanction is that issued by Charles VII. of France, in 1438, in consequence of the schism in the church between the council of Basle and Pope Eugenius IV. [Eugenius IV.] In this dilemma, Charles, doubting which of the two contending parties was in the right, assembled a national synod at Bourges, in which legates attended both from the pope and from the council of Basle. In this synod it was decided that the earlier decisions of the council of Basle issued previous to the schism, and which had been ratified by Eugenius himself, were binding upon the church. One of the most important of these decisions was that which asserted the supremacy of the general council over the pope. Twenty-three articles were consequently signed by the king, with the concurrence of both his spiritual and lay advisers, for the regulation of the discipline of the Gallican church, framed upon the decrees of the council of Basle, and these constitute the pragmatic sanction of Charles VII. The most important of these articles were: 1. The election of bishops was declared to belong to the respective chapters, subject to the royal sanction. 2. The court of Rome was no longer allowed to interfere with the disposal of the minor benefices. 3. The cases in which appeals to Rome were allowed were strictly limited. 4. The annates, or first-fruits, paid to Rome, were abolished. About twenty years after, Louis XI., wishing to please pope Pius II. in order to obtain the investiture of Naples for the duke of Anjou, gave up the pragmatic sanction, the original of which he sent by the bishop of Arras to Rome, where it was ignominously dragged through the streets. The parliament of Paris remonstrated, and some years after, Louis having quarrelled with the pope, the pragmatic sanction again obtained the force of law. That edict was in fact the foundation of the liberties of the Gallican church. The concordat of Francis I. with Leo X. made considerable improvements in the regulations of the pragmatic sanction, and gave rise to a strong opposition on the part of the parliament of Paris. [Concordat.]

Another pragmatic sanction, which has acquired an historical celebrity, is that issued by the emperor Charles VI., in his capacity of king of Bohemia and sovereign of the other hereditary states of the House of Austria. This pragmatic sanction regulated the succession in his family. [Habsburg, House of; Charles VI. of Germany.]

PRAGUE, the capital of Bohemia, is situated nearly in the centre of the kingdom, in 50° 5′ 19″ N. lat. and 14° 25 E. long. It lies on both banks of the Moldau, in a narrow valley which is shut in by eminences, on the sides of which a great part of the city is built. In size and beauty Prague is the third city in Germany, and produces a very striking effect when viewed at a distance, by its commanding situation, the lofty steeples of its numerous churches, and the fine palaces and public buildings. The city consists of four parts, formerly called towns, but now designated as quarters. There are on the right bank of the river—1st, the old town, which is gloomy and closely built, and which includes the quarter assigned to the Jews, who, as in some other towns in Germany, are not allowed to reside amongst the Christian population. This quarter is a real labyrinth of crooked mean streets, with only 278 houses, in which nearly 7000 Jews are crowded together, so that many an inconsiderable house belongs to ten different owners, and two or even three families live in one room. 2nd, the new town, which is larger than the old town, which it completely surrounds. The new town has finer and broader streets, spacious squares, lower houses, and a healthy site. On the left bank of the Moldau the two eminences called the Laurenzberg and the Schlossberg form a semicircle, enclosing a valley in which the quarter called the Kleinseite (or Little Prague) is built. This quarter is much smaller than the old town, but contains many considerable gardens, fine palaces, and lofty houses. The fourth quarter, called the Hradschin (pronounced Radshin), is built on the Schlossberg (the Palace Hill). This is the smallest but the finest part of the city, in which there is a great number of magnificent palaces. The town of Wissehrad, which joins the new town, and the village of Smichow, on the left bank of the Moldau, are reckoned as part of Prague. Including all these parts, the city is ten miles in circumference, and two miles and a half in diameter. There is likewise a new suburb called the Karotenenthal. The city is surrounded with fortifications, and has eight gates. Though some portions, particularly in the old town, are gloomy and ill built, having many short, crooked, and narrow streets and lanes, it has been much improved of late years. The old town and the Kleinseite are connected by the celebrated bridge over the Moldau, the construction of which was commenced by Charles IV. in 1358, and completed by Vladislaus II. in 1507. It is 1790 Vienna feet long, 35 broad, and has 16 arches: it is adorned with 29 statues and groups of saints, and has an antient tower at each end. There are in the city forty-six Roman Catholic and two Protestant churches, nine synagogues, fifteen monasteries, and sixty-eight palaces. It may be imagined that even a partial description of them would far exceed our limits, and we must confine ourselves to those most worthy of notice. The metropolitan church of St. Veit, in the Hradschin quarter, was commenced in the beginning of the tenth century, but not completed till 1500. The steeple is 314 feet high, and affords a magnificent view of the city. It is a fine specimen of antient German architecture, and the curiosities which it contains would take a volume to describe them. There are the sepulchres of several emperors and kings, of Bohemian princes, and remarkable men. Of the twelve chapels in this cathedral, that of St. Wenzel is richly adorned, and contains paintings of the fourteenth century, a Madonna, said to be by Holbein, and numerous antiquities and relics. The great ornament of the cathedral is considered to be the richly adorned monument of St. Nepomuck (Nepomucenus), the patron of Bohemia. The other old church is the cathedral on the Thein, which was built at the end of the ninth century, but has been disfigured by various additions in the course of so long a time. It contains the tomb of the great astronomer Tycho Brahe, who died in 1603. Many of the more modern churches, which are chiefly in the Italian style, are worthy of attention. Among the palaces, the Imperial palace in the Hradschin is the most remarkable building in the whole city, both for its immense extent and its fine and commanding situation. Of the 440 apartments, the hall of Vladislaus is a noble work of Gothic architecture, second only to that of Westminster. King Charles X. of France and his family resided for some years in this palace after their expulsion from France. Among the other palaces the most magnificent are those of the famous Wallenstein, of Count Czerny, of Count Ledebour, and two of Prince Schwarzenburg. The principal public buildings are—1, in the old town, the Collegium Clementinum, built by the Jesuits, in which Joseph II. placed the archiepiscopal seminary, where from 300 to 400 pupils are educated as secular priests. It contains many lecture-rooms, the academy of painting, a gymnasium, the university library, the observatory, a printing-office, and several scientific collections. The old town contains also the theatre, the mint, and several palaces. 2. In the new town, the senate house, the custom-house, and the military hospital, one of the largest and most regular buildings in the city. Most of the hospitals and charitable institutions are in the new town. 3. In the Kleinseite, the arsenal and the government-house. 4. In the Hradschin, the archbishop's palace.

The university of Prague is the oldest in Germany. It was founded in 1348 by Charles IV., on the model of that of Paris, and had so many privileges and able professors that, up to 1409, it had a large number of students. But after the death of Charles, disputes arose between the foreigners, whom he favoured, and the natives. Wenzel allowed the Poles, Bohemians, and Saxons together only one vote in elections, while the Bohemians had three votes. This caused many thousands of the former to leave the university, and gave occasion for the foundation of the universities of Leipzig, Ingolstadt, Rostock, and Cracow. From that time the university could never recover, till Maria Theresa, Joseph II., and Francis II. became its protectors. It has now 53 professors, 14 assistants, and above 2000 students. The medical faculty in particular is most liberally provided for. Connected with it are a veterinary school, a school for midwifery, five clinical institutions, one of them for surgery, zoological and anatomical collections, a botanic garden, a chemical laboratory, and an observatory, most amply furnished by Joseph II. and Francis II. The annual expense of the university is 261,717 florins. There are three gymnasia to prepare students for the university. The schools for the education of persons not intended for the learned professions and for the inferior classes are very numerous. There are likewise a polytechnic institution, an economical society, an academy of the fine arts, and a musical conservatory, but above all the Academy of Sciences, and the Bohemian National Museum, founded by Count Colowrat, with important collections, and libraries. The university library consists of 130,000 volumes, and 4000 rare MSS. of classical and Slavonian literature, besides which there are eight public and several private libraries open for public use. The Imperial Cabinet of Natural History has been greatly increased of late years. The charitable institutions, for instance the hospitals of the brothers and sisters of Charity, are in the most admirable condition. There is a great number of physicians for the poor, a vaccine institution, twelve hospitals, of which that called the General Hospital receives annually from 1300 to 1600 patients, without regard to the difference of religion, which is not the case in the others; a lunatic asylum, a lying-in hospital, &c. The poor are lodged, maintained, and clothed partly by private societies, partly in poorhouses, and there are also ten public and private institutions for widows and orphans, among which are an asylum for the blind, and another for the deaf and dumb.

Prague has extensive manufactories of various kinds, in all about sixty manufactories of cotton, hosiery, silk, wool, leather, hats, gloves, earthenware, gold and silver, plated goods, mathematical and musical instruments, glass, buttons, snuff and tobacco, paper and paper-hangings; besides which there are breweries, saltpetre-works, and many others. Prague has a very flourishing trade, being the centre of that of Bohemia: the transit trade is considerable, and there are three great annual fairs.

Though Prague has long ceased to be the residence of the sovereign, it is the seat of the government of the kingdom and of the courts of justice, and is the head-quarters of the military governor of the kingdom, with a garrison of 12,350 men. It is also the residence of numerous families of nobility and gentry, whose incomes are such as to exempt them from the necessity of living in retirement, though not to enable them to figure at the court of Vienna. But it must be observed that the higher nobility come little in contact with the other classes, and in general the pursuit of pleasure is more attended to by the great mass of the inhabitants than the more refined enjoyments of science and learning. There is but little, comparatively speaking, of what we should call society. The pleasures of the country, promenades, and gardens, are not much sought after at Prague. There are however some islands in the Moldau laid out in walks and tea-gardens; the palace garden and that of Count Waldstein (Wallenstein), which are open to the public twice a week; the grounds of Prince Kinsky and Baron von Wimmer, and some others. The environs of Prague abound in natural beauties. The great delight however of the citizens are balls, concerts, masquerades, the theatre, and religious festivals, some of which, for instance that of St. Nepomuck on the 16th of May, are celebrated with much pomp.

Prague is an antient city, but the time of its foundation is uncertain. Some say it was built by the Marcomanni, and called in the fifth century Marobodonum; others that it was founded by the Czeches in 611; and others ascribe its origin to Queen Libussa in 723. The city has suffered frequently and severely by the calamities of war, especially in the troubles caused by the persecution of the Hussites in the fifteenth century. In 1620, in the contest between the elector palatine and the emperor for the crown of Bohemia, a battle was fought on the White Mountain, two miles from the city, in which the Imperial troops were victorious, and the elector Frederick V., son-in-law of James I. of England, lost the crown. In 1741 a French corps was blockaded in Prague, and made a vigorous defence, and when reduced to the last extremity by famine, evacuated the city and retreated in good order. In 1744 Frederick II., with 100,000 men, appeared before Prague, of which he got possession, but ten weeks afterwards was obliged to evacuate it. There was some smart fighting in the city itself; the Prussians left 2000 prisoners, 132 cannon, and 12 mortars in the hands of the Austrians. In 1757 Frederick again besieged Prague, and immense damage was done by the bombardment; nearly 900 houses were destroyed, and the churches suffered severely. The victory of the Austrians at Collin obliged Frederick to raise the siege, since which time Prague has not seen an enemy before its walls.

The inhabitants of Prague are chiefly Bohemians (Czeches) and Germans, and most of them speak both languages. With respect to religion, the vast majority are Roman Catholics, as may be judged by the number of their churches. The present population is at least 120,000, including about 7000 Jews and the garrison.

(*Die Oesterreichische National Encyclopædie*, 1838; Blumenbach, *Gemälde der Oest. Monarchie*, 1832; Hassel; Stein; Hörschelmann; Cannabich; Griesels, *Neuestes Gemälde von Prag;* Schottky, *Prag wie es was und ist*, 1830.)

PRAIRIES. [PLAINS.]

PRAKRIT. [SANSKRIT.]

PRAM, CHRISTIAN HENRIKSEN, who has left a name of some eminence in Danish literature and poetry, was born September 4th, 1756, in Guldbrandsdalen. After having been educated by his father, who was a clergyman, and next passing a short time at the school at Fredericksborg, he was sent to the university of Copenhagen, where he applied himself to the study of law and political economy. He did not however adopt the former as a profession, and though he afterwards continued to give his attention to the other, poetry and literature became his chief pursuits. His continuing to apply himself to a study so much at variance with his taste for poetry as that of political economy, is accounted for by his being appointed, in 1781, to a high situation in the Chamber of Commerce. Shortly afterwards he married, and, in order to increase his income, set up the 'Handelstidende,' or 'Commercial Journal,' which he first carried on in conjunction with Cramer and Ehrhart, and afterwards by himself, but gave it up at the end of five years, though the publication itself has since continued.

From that time he devoted himself, as far as his official duties would permit, to literature, and had indeed already signalised himself in it by his 'Stœrkodder,' which appeared in 1785, and the success of which most probably induced him to withdraw from the publication above mentioned, and employ his pen more congenially with his own feelings. This poem was then altogether a novelty in Danish literature, and though it does not answer to the character of an epic, it is something very superior to a Riimkronik, or mere chronicle in verse, as its author modestly styles it, being a romantic narrative founded upon the traditions of northern legend and mythology, and recording the hero Stœrkodder's adventures in search of Skirner's mystic sword and other talismans. Thus considered, this production of Pram's (in fifteen cantos) is a classic one of its kind, and is one that places its author by the side of Ariosto and Wieland.

Shortly afterwards he commenced, with the assistance of Rahbek, the 'Minerva,' one of the best literary periodicals of its time in Denmark, and one which also discussed many important political and statistical questions. Few could have been better qualified than Pram for conducting such a miscellany, he being equally at home in both departments of it; and to the literary part he contributed a number of his minor pieces both in prose and verse. Among his other services to literature may be reckoned that of having, together with Thaarup, Baggesen, and Höst, established the Scandinavian Literary Society in 1796; of which institution he was president from 1811 to 1818. He may also be ranked among the Danish dramatists, having, besides his 'Damon and Pythias,' and 'Fingal and Frode,' produced several comedies and some minor pieces for the stage.

On the Chamber of Commerce being united, in 1816, with the Board of West India Affairs, Pram retired from his situation in the former; but though his various emoluments had been very considerable for a series of years, and though he was allowed a pension of 1800 dollars, he was in such straitened if not embarrassed circumstances, that after the death of his wife, in 1819, he resolved to accept an official appointment in the island of St. Thomas. He accordingly proceeded thither in the following spring, departing without the hope of ever revisiting his native land, being then in his sixty-third year. He died at St. Thomas's, November 25th, 1821.

A collection of his miscellaneous poems and prose works was edited by Rahbek, in 4 vols., 1824-26. Oehlenschläger, who has drawn his character, describes him as a man of powerful mind and excellent disposition, though subject to occasional violence of temper, and of great and varied talents and attainments. Of his 'Stœrkodder,' he says that it possesses many detached parts of very great beauty; but among all Pram's productions he gives the preference to the poem entitled 'Emilias Kilde.'

PRANGOS, a genus of plants of the natural family of Umbelliferæ, tribe Smyrneæ, so named by Dr. Lindley from the name by which the only species is known in its Tartarian habitat, where it was discovered by Mr. Moorcroft, in the neighbourhood of Imbal or Droz, and which he visited for the purpose of examining into the reputed qualities of this plant, of which the accounts seemed to border on exaggeration. Almost all the knowledge which we possess respecting the plant, is derived from the observations of that lamented and enterprising traveller.

The Prangos Hay-plant is herbaceous and perennial, having a large fleshy root-stalk, usually measuring at the top from eighteen to twenty-two inches in circumference, and formed by the aggregation of an infinite number of crowns or winter-buds, clustered together at or above the surface of the ground. These crowns being closely covered by the fibrous remains of the old leaves, are thus protected from the frosts of winter. The crop consists of the leaves, which rise in abundance from each crown, are finely cut, about two feet in length, and have a highly fragrant smell, extremely similar to that of very good new clover hay.

This Mr. Moorcroft considered as a most important and interesting object of rural economy, and says that the properties of prangos as a food appear to be heating, producing fatness in a space of time singularly short; it is also destructive to the fasciola hepatica, or liver-fluke, which in Britain, after a wet autumn, destroys some thousands of sheep by the rot. The last-mentioned property, of itself, if it be retained by the plant in Britain, would render it especially valuable to our country. But this, taken along with its highly nutritious qualities, its vast yield, its easy culture, its great duration, its capability of flourishing on land of the most inferior quality and wholly unadapted to tillage, impart to it a general character of probable utility unrivalled in the history of agricultural productions. When once in possession of the ground, for which the preparation is easy, it requires no subsequent ploughing, weeding, manuring, or other operation, save that of cutting and of converting the foliage into hay. Of its duration he relates that its seeds, having been carried westward along with those of yellow lucerne, above forty years ago, and sown on the eastern frontier of Cashmere, vegetated, and that the plants of the first growth still remain in a flourishing condition. He conceived that by the cultivation of this plant, moors and wastes hitherto uncultivated may be made to produce large quantities of winter fodder, and that the yield of high lands and downs enjoying a considerable depth of soil may be trebled.

Notwithstanding the highly favourable accounts given by Mr. Moorcroft, it is doubtful whether the prangos, though highly deserving of trial, would be so valuable as he anticipates in the situations which he points out. Dr. Falconer, in his visit to Cashmere and Tibet, found it in the latter, as well as on a low trap hill in the former, but not so vigorous in the Cashmerian as in its Tibetan habitat. He states that though abundant in various directions, the Cashmerians do not esteem it of any value. Dr. F. is of opinion therefore that its importance has been much over-estimated, in consequence of its being the only food in many of the bleak and barren tracts of Tibet. In Cashmere, where there is a superabundance instead of a deficiency of pasturage, it is accordingly much less esteemed. But in many barren and bleak situations, with considerable cold in winter, it would no doubt be a valuable acquisition, if the climate of the country be not too moist. Parts of the Cape of Good Hope, New Holland, and Van Diemen's Land seem well suited to it.

Arrian, in describing Alexander's expedition across the mountains which he calls Caucasus and Paropamisus (iii. 28), says, nothing but Silphium and the turpentine-tree grow there, notwithstanding which it is very populous, and multitudes of sheep and neat cattle are seen, for they feed upon Silphium, of which the sheep especially are very fond. This bears so close a resemblance to the prangos, both in locality and properties, that it is as likely to have been the Silphium of the antients as the assafœtida plant, which it is supposed to be by others. [SILPHIUM.]

PRANI'ZA. [ISOPODA, vol. xiii., p. 56.]

PRA'SII. [HINDUSTAN, p. 223.]

PRATI'COLA. [SYLVIADÆ.]

PRATINCOLE (*Glareola*, Briss.), a genus of birds allied to the plovers. [PLOVERS.] Temminck places the form under his order (the 11th) *Alectorides*.

Generic Character.—*Bill* short, hard, convex, curved for upwards of half its length, and compressed towards the point. *Nostrils* at the sides of the base, oblong, and obliquely cleft. *Legs* feathered nearly to the knee; toes, three before and one behind, the outer united to the middle one by a short membrane; claws long, and drawn to a fine point. *Wings* very large, the first quill-feather the longest. *Tail* more or less forked. (Gould.)

Example, *Glareola torquata*, *Hirundo Pratincola*, Linn.

Description.—*Old Male and Female.*—Summit of the head, nape, back, scapulars, and coverts of the wings grey-brown; throat and front of the neck white slightly tinged with reddish, which colour is encircled or framed, as it were, by a very narrow black band, which ascends towards the corners of the bill; space between the eye and the bill black; breast whitish brown; under coverts of the wings chestnut red; lower parts white, clouded with reddish; coverts of the tail and origin of the caudal feathers pure white, the rest blackish towards their end; bill black, red at its base, iris reddish brown; naked circle round the eyes bright red; feet reddish ash; tail very much forked. Length rather more than nine inches. (Temm.)

In this state it is the *Perdrix de Mer* of Brisson, &c.; the *Perdrix de Mer ordinaire et à Collier* of Gerard; *Austrian Pratincole* of Latham; *Das Rothfüssige Sandhuhn* of Bechstein; *Das Oestrichische Halsband* and *Südliche Sandhuhn* of Brehm; and *Pernice di Mare* of Savi.

Varieties.—The grey brown brighter or deeper; the white of the throat more or less clouded with reddish or bright russet; the gular black band more or less intense in colour, and often accompanied by a very small white line. The band too is often only indicated by small black spots. (Temm.)

Young.—Upper parts brown ash clouded with deeper undulations and whitish borders; throat tarnished white surrounded with brown spots, disposed so as to replace the band which surrounds this part in the old birds; breast and belly deep grey with brown spots, but sometimes without spots; the tail less forked, and the lateral feather much shorter than in the old.

In this state it appears to be *La Perdrix de Mer à Collier, la grise, la brune, et la Giarole* of Sonnini (Buff.); *La Perdrix de Mer des Maldives, de Coromandel, et de Madras*, of Sonnerat; *Das braunringige Sandhuhn und Gefleckte Sandhuhn* of Bechstein; and *collared* and further varieties of *Pratincole* of Latham.

Food, Habits, Geographical Distribution, &c.—'The genus *Glareola*,' says Mr. Gould, in his great work on the *Birds of Europe*, 'appears to be strictly confined to the old world, no Transatlantic example having ever been discovered, nor indeed are we aware of any form in the ornithology of America which at all approaches the present. Three species are all that are as yet discovered. Of these, two (the *G. grallaria* and the *G. lactea*) are peculiar to the eastern provinces of Asia and Africa; the other, the bird now before us (*G. torquata*), is spread throughout the warm and temperate regions not only of these continents, but Europe also: hence it would seem as if nature endeavoured to make up by extent of habitat for the limitation of species. Still however, although thus diffused, the Pratincole may be said to be truly a native of the eastern provinces of Europe on the Asiatic borders, and especially Hungary, where wide tracts of morass and flat lands, abounding in lakes both fresh and saline, and traversed by mighty rivers, afford it food and security. "In Hungary," says M. Temminck, "among the immense morasses of the lakes Neusidel and Balaton, I have been in the midst of many hundreds of these birds;" and we might add that it is no less abundant in Western Tartary. In England it is only an occasional visitor; but in Germany, France, and Italy, it is a bird of periodical occurrence.'

M. Temminck, in the last part of his *Manuel*, states that it breeds in Sardinia, and that it is very abundant in Dalmatia, on the borders of the lake Boccagnaro, on its spring passage. The eggs he describes as being yellowish white. 'With the long wings and forked tail of the swallow,' we again quote Mr. Gould, 'the Pratincole possesses that rapidity and power of flight for which the bird is so remarkable. It takes its food, which consists of insects, and especially such as frequent marshes and the borders of rivers, while on the wing, darting along in the chase with the rapidity of an arrow; nor is it less distinguishable for celerity on the ground, and often catches its prey as it nimbly runs along. This elegant and graceful bird incubates in the concealment afforded by reeds, osiers, and tall herbage, laying three or four white eggs.'

Glareola torquata.

PRATT, C. [CAMDEN, LORD.]

PRAWN. [SHRIMPS.]

PRAXA'GORAS (Πραξαγόρας), a celebrated physician of Cos, belonging to the family of the Asclepiadæ. (Galen, *De Dissect. Vulvæ*, cap. ult.) His father's name was Nearchus, and he was one of the last of his family who acquired any reputation as a physician. His most celebrated pupil was Herophilus (Galen, *De Different. Puls.*, lib. iv., cap. 3), and he himself was particularly famous for his skill in anatomy and physiology. The titles of several of his works are preserved, but only a few fragments of them remain, together with some of his opinions on medical subjects recorded by Galen and others. He was the first person who pointed out the distinction between the veins and arteries, and affirmed that it is only in the latter that any pulsation is felt, although he believed them to be filled with air (Galen, *De Dignosc. Puls.*, lib. iv., cap. 2), and he accounted for the hemorrhage that occurs when they are wounded by attributing it to an unnatural state, in which the wounded arteries attract to themselves the blood from all the neighbouring parts. He supposed that the heart gave birth to all the ligaments, and that the arteries are ultimately converted into nerves (or ligaments) as they contract in diameter. (Galen, *De Hippocr. et Plat., Decret.*, lib. i., cap. 6.) The brain he supposed to be of no particular use, but merely an expansion of the spinal marrow. His anatomical skill and observations made him introduce several improvements into the theory and practice of medicine; for example, he declared that the pulse indicates the variations of the strength of the disease, a discovery which threw great light on the knowledge of diseases. He imagined the humours of the body to be the cause of all sorts of diseases, and that the vena cava is the seat of an intermittent fever. (Ruf. Ephes.) The greater part of the remedies that he employed were taken from the vegetable kingdom, and we are told by Cælius Aurelianus that he was very fond of emetics (*De Morb. Acut.*, lib. iii., cap. 17). In cases of iliac passion he recommended emetics, as several modern practitioners have also done; and when attended with intro-susception, he ventured to open the abdomen, in order to replace the intestine (Cæl. Aurel., *loco cit.*), an operation that has been proposed and executed in modern times. Notwithstanding the extravagance of some of his opinions, he must have been a very remarkable man, and we may well regret that we know so little of his practice. He lived about B.C. 300 (Ol. 120).

PRAXI'TELES, a sculptor of Greece. Neither the exact time nor the place of his birth is known. It is also remarkable that there is no mention of the master under whom he acquired the rudiments of the art, in which he made such important changes with regard to style, that he is justly considered the founder of a school. The period at which he flourished is however pretty clearly established on the authority of antient writers, as well as by the testimony of some of his works and by the received dates of artists who are classed as his contemporaries. Pliny (*Hist. Nat.*, xxxiv. 8) says Praxiteles flourished in the hundred and fourth Olympiad, at the same time with Euphranor, who was a celebrated statuary and painter. Pausanias (viii. 9) says Praxiteles lived three generations after Alcamenes. He must therefore, according to these statements, be placed at about 360 B.C.; or if, as some antiquaries have contended, he executed a work so late as the hundred and twenty-third Olympiad, or 284 B.C., he may have begun his career as an artist rather later than the time mentioned. It is however quite possible, supposing he lived to an extreme old age, that Praxiteles was practising as a sculptor at the periods recorded, although they include a range of seventy-six years.

Praxiteles was eminent for his works both in bronze and marble, but he seems to have had the highest reputation for his skill in the latter. 'Praxiteles marmore felicior et clarior fuit;' and again, 'Praxitelis ætatem inter statuarios diximus qui marmoris gloria superavit etiam semet.' (Plin., *Hist. Nat.*, xxxiv. 3, and xxxvi. 5.) Pliny and Pausanias enumerate a long list of the productions of Praxiteles. Amongst those in bronze, which appear by the concurrent testimony of antient writers to have been held in the highest estimation, were a statue of Bacchus and another of a satyr, so excellent that it was called by way of distinction Periboetos (the celebrated). He also made a statue of Venus, which was afterwards destroyed by fire; likewise a statue of a youthful Apollo, called Sauroctonos, or the lizard-killer, as he is represented in the act of killing a lizard. Two statues of women are also recorded by Pliny; one of them represented a matron weeping, the other a courtesan laughing. The latter was much admired for its expression. it was believed to be a portrait of the celebrated Thespian courtesan Phryne. Of these works and several others in the same material, the only record that remains is an undoubtedly antient copy, in marble, of the Apollo Sauroctonos. It is too well known to require a particular description in this place. Though defective in some trifling respects of detail, it is not difficult to judge from it of the purity of style, and grace and beauty of form, which must have characterised the original. It is justly considered one of the greatest treasures of the Vatican. Among the works in marble by Praxiteles, the famous Venus of Cnidus must undoubtedly be placed in the first rank. We are told that two statues of the goddess were made; one draped, the other entirely naked. The people of Cos preferred the first; the Cnidians immediately purchased the latter. The fame of this statue was so great that travellers visited Cnidus solely for the purpose of seeing it; and Nicomedes, the king of Bithynia, was so desirous to possess it, that he offered to pay off a heavy debt for them if the Cnidians would consent to give up this celebrated work. The tempting offer was, to the honour of the people of Cnidus, declined. Praxiteles, observes Pliny, 'illo enim signo nobilitavit Cnidum.' There were doubtless many copies of so celebrated a work, and the representation of a figure of Venus on the coins of Cnidus affords unquestionable authority at least for the action and general composition of the far-famed statue. The Venus of Cnidus is mentioned by Lucian as the finest of the works of Praxiteles (Εἰκόνες, c. 4), and from the description in another passage (Ἔρωτες, c. 13, &c.) we may form some notion of the style of this celebrated work. It is also the subject of numerous epigrams in the Greek Anthology. The original work fell a prey to the flames, at Constantinople, in the fifth century, in the dreadful fire which destroyed so many other fine monuments of art collected in that city. The loss of the Venus of Cnidus may justly be considered among the greatest which art has sustained; for no production in antient sculpture, with the single exception of the Olympian Jupiter of Phidias, has received such universal and such unqualified admiration. Two statues of Cupids are also mentioned among the most esteemed works of this master. One of these was so beautiful that it is placed by Pliny quite on an equality with the famous Venus of Cnidus. It was made of marble of Paros. It is thought that a copy of it exists in the collection of sculpture in the Vatican. An anecdote connected with this statue will not be misplaced here. It is recorded, with some slight variation, by more than one antient writer, and it is interesting as, if founded on fact, it tends to confirm, by the artist's own judgment, the high opinions which have been given of two of the most remarkable of his productions; and if it is not authentic as regards the principal actors, it at least shows the feeling that existed antiently respecting the works alluded to. 'Phryne, whose influence over the sculptor seems to have been considerable, anxious to possess a work of Praxiteles, and not knowing, when she was desired to choose for herself, which of his exquisite statues to select, devised the following expedient. She commanded a servant to hasten to him and tell him that his workshop was in flames, and that with few exceptions his works had already perished. Praxiteles, not doubting the truth of the announcement, rushed out in the greatest alarm and anxiety, exclaiming "all was lost if his Satyr and Cupid were not saved." The object of Phryne was answered; she confessed her stratagem, and immediately chose the Cupid.' (Pausanias, i., 20.) Among other works that have been thought worthy to be recorded were two statues of Phryne: one was of marble, and was placed in the temple of Venus at Thespiæ, the native place of the courtesan; the other was of bronze gilt, and was dedicated by her at Delphi, where it had the honour of a distinguished place. Praxiteles appears also to have executed works of a more extensive character and composition. The chief of these were some sculptures that decorated the pediments of the temple of Hercules at Thebes. (Paus., ix. 11.) They represented part of the labours of Hercules.

The style of the school of which Praxiteles may be considered the founder was softness, delicacy, and high finish. We read of few of his productions of a sublime or severe character, such as distinguished the art which immediately preceded his æra under Myron, Phidias, and Polycletus; whose genius led them to represent the more exalted and majestic personages of the antient mythology, as Jupiter, Juno, and Minerva, or the classic forms of heroes, warriors, and athletes. Praxiteles, on the other hand, seems to have been attracted by, and to have devoted himself to, the lovely, the tender, and the expressive. Beyond this he appears to have acquired great skill in execution, and to have had some peculiarities in the mode of finishing his marble. He is said to have declared that he considered those to be his best works which had undergone the process of '*circumlitio*' by Nicias. From the circumstance of Nicias being a painter, it seems reasonable to conclude that this cannot simply mean polishing and rubbing, but that some varnish or encaustic was laid over the surface of the marble after it had left the sculptor's hands, in order to give it a rich softness, similar to what the Italians, in speaking of the flesh surface of marble, call the '*morbidezza di carne*.' Modern ingenuity has vainly endeavoured to discover the process alluded to. It was in all probability a wash of some sort; but whether a simple application of water-colour, or of varnish (if the latter, either the preparation or the statue being warmed to a certain temperature), there are now no certain means of judging. From some experiments that have been made, and the close resemblance produced to some portions of the surface of antient marble, it seems probable that the latter mode of operation approximates in some degree to the antient process.

Praxiteles had two sons, Timarchus and Cephisodotus, or Cephisodorus, both of whom were artists. Pliny says of the latter, 'Praxitelis filius Cephisodotus rei et artis heres fuit.'

There was another artist called Praxiteles living at a later period. He was a modeller and chaser. There was also a painter of the same name, mentioned by Pliny (*Hist. Nat.*, xxxv. 11).

PRAYA. [AZORES.]

PRAYER, a term in theology, used to designate the intercourse passing between human minds and the divine. Language appears not to be necessary to complete the idea which the word represents, since we speak of mental prayer, which is thought directed heaven-wise in adoration or in entreaty without the sentiment of the mind being embodied in words or finding expression by the lips. But its far more common use is to express this kind of intercourse when the sentiment of the mind is embodied in language.

It is a derivative of the verb to *pray*, which signifies to ask for something, and the intercourse of which we have spoken is described by a word which etymologically describes only one part or section of the whole idea, inasmuch as in such intercourse the principal object will always be the supplication of those rich communications of good which God can bestow and man receive.

Prayer springs immediately out of the persuasion that man is not placed on this globe without a protecting and governing power over him, which power is conceived to belong to the One Great, Good, and Wise Being, who was the Creator at first of man himself, and of all the things by which he is surrounded, or which touch in any way his condition. Wherever this idea is fully formed, it seems that the mind must, occasionally at least, fall into the disposition to entreat that the Power, which can do so much for it, would be pleased to exert itself. Whether this government and this ability be vested in some one being, or be supposed to be distributed among many, either equal in power, or supreme and subordinate, the case is the same. Circumstances arise in which it seems that it would be impossible to withhold the mind from assuming the *form* of supplication and the lips from expressing the desires which have sprung in the mind. We accordingly find that prayer has existed from the earliest times when we find men raised into the rank of religious beings, and in any state of religious knowledge, however rude and mistaken the ideas may have been; in times of danger and calamity at least, men have thrown themselves prostrate before a superior power, and entreated its interposition.

Sometimes the prayer may be no more than a brief ejaculation; but if arising in the sincerity of the heart, it is not the less prayer, nor the less regarded by Him who is described in the Holy Scriptures as the God that heareth prayer.

But even in some of the earliest monuments of human thought and feeling we have prayer that has not been mere ejaculation, or even the mere expression of feeling excited by temporary emergencies: and there are come down to us various prayers used by good men in antient times expressive of their desires, and at the same time showing how other topics may properly be introduced and mingled with supplication. There are prayers of men who had not the light of either of the divine dispensations, and there are wise directions concerning prayer in the writings of such men: but the Scriptures, both of the Old Testament and the New, contain many prayers, and many hints and observations respecting prayer, all of which are very instructive, and held in devout reverence by those who receive the persons whose words are there recorded as examples and authorities.

From these examples, and from the instructions incidentally given, Christian divines have deduced certain principles respecting prayer. They have in fact raised a kind of system of prayer: dividing and subdividing the several branches of it. Of these it will be sufficient to say that a prayer, or a body of words expressive of the intercourse, should contain (1) expressions of adoration and admiration of the Mighty Being who is the object of address, by which the mind is brought into a state of confidence that he can grant that which we entreat of him: (2) expressions of our own unworthiness to receive more blessings than he has already seen proper to bestow upon us; either on account of a general persuasion of demerit, or of some particular sin of which we have been guilty. This is thought to be in accordance with the actual state of every one who thus puts himself as it were more immediately in the awful presence of his governor and judge, and to be also salutary to the suppliant as keeping up a sense of proper humility, and a disposition to acquiesce in whatever may be the divine will. (3) Then comes the supplicatory part, in which general or particular blessings are besought, suitable either to the general condition of the person praying, or to the particular circumstances of the moment. (4) Intercession for others, the entreaty of the divine favour for the whole human race, and such blessings as particular classes of persons peculiarly need. This is thought necessary as cherishing the kind and charitable feelings, and leading each individual man to feel himself but as one of a great family of whom God is the common head and the common protector, and whose interests are not to be disregarded in attention to the wants and wishes of an individual member of it. (5) Lastly comes thanksgiving, a devout acknowledgement of past and present mercies, the good which God has given in his natural providence in general, or any special good which he may have granted. Such, according to Christian divines, ought to be the form into which men's thoughts cast themselves when they enter into communion with God: and the various prayers which are delivered in public by the ministers of religion in behalf of multitudes praying together, are for the most part constructed in this form, the differences arising (1) from the selection of different subsidiary topics under each, and (2) from the greater length in which each of these subjects is entered into, according to the feeling or the notions concerning prayer of the individual minister; and such also are the prayers for the most part in those collections of prayers many of which are printed for the use of persons, either in their private or family devotions, who find a difficulty in embodying in words the sentiment of the heart.

Liturgies are of the nature of printed collections of prayers. They are guides to the mode in which the prayers of many assembled in Christian congregations shall be offered. The Book of Common Prayer contains the Liturgy of the English Church as appointed by authority. The effect of liturgies in public worship is to restrain the manifestation of peculiarities in the notions of particular ministers respecting the nature and subjects of prayer: to keep out of the public assemblies of Christians extravagancy and enthusiasm: to bring the will of the community at large to bear on the wills of single ministers in respect of the devotional part of public worship; and to make known beforehand to the people what sentiments will be expressed, and in what form of words, in the service in which they are about to engage.

PREACHING. [Oratory.]

PREBEND (*prebenda*, from *præbeo*, a Low Latin word signifying provision or provender), the portion which the member of a cathedral or collegiate church, called a prebendary [Prebendary], received in right of his place for his maintenance. It was named from the place whence the profit proceeded, which was either from some temporal lands or church preferment attached to that church, or some other church whose revenues were appropriated towards the maintenance of the member of the cathedral or collegiate church. Prebends were of two kinds, simple and dignitary.

A simple prebend was one which had only its revenue for its support; a prebend with dignity, one to which a jurisdiction was annexed; a prebendary holding the latter was styled a dignitary. Some prebends were donative, others in the gift of laymen, who, in case of vacancy, must have presented the future prebendary to the bishop; on this the bishop instituted him, and the dean and chapter then inducted and placed him in a stall in the church. If a bishop were the patron, he collated. At Westminster the king collated by patent, by virtue of which the prebendary took possession without institution or induction. A mandamus lies to compel an election to fill a vacancy. During a vacancy the profits belonging to a prebendary as sole corporator went to his successor; those which he held as member of the corporation aggregate were divided among the dean and chapter. A prebend, being a benefice without cure of souls, was not formerly incompatible to be held with a parochial benefice, but one prebendary could not possess two prebends in the same church, though he might in any other. But now, by 1 & 2 Vic., c. 106, no spiritual person holding more benefices with cure of souls than one shall hold any cathedral preferment; or, holding any cathedral preferment and also any benefice with cure of souls, shall hold any other cathedral preferment; or, holding any preferment in any cathedral or collegiate church, shall hold any preferment in any other. (Comyns's *Digest*, tit. 'Prebend;' Burns, *E. L.*, 88, 90; Rogers, *On Ecclesiastical Law*, tit. 'Dean and Chapter.') [Dean.]

By the 3 & 4 Vic., c. 113, founded on the Report of Commissioners appointed to consider the state of the church with reference to its revenues, very important changes are made relative to cathedral preferment. The statute does not affect existing interests. Its provisions, in general terms, are as follow:—Henceforth all the members of chapters are to be styled canons. Provision is made for the suppression of many existing prebends, the creation of one additional for St. Paul's, and ultimately all cathedral and collegiate churches, as to number of canons, are to be placed upon the following footing:—

Cathedral or Collegiate Church.	No. of Canons.	Cathedral or Collegiate Church.	No. of Canons.
Canterbury	6	Manchester	4
Durham	6	Norwich	4
Ely	6	St. Paul's, London	4
Westminster	6	Peterborough	4
Winchester	5	Ripon	4
Exeter	5	Rochester	4
Bristol	4	Salisbury	4
Carlisle	4	Wells	4
Chester	4	Windsor	4
Chichester	4	Worcester	4
Gloucester	4	York	4
Hereford	4	St. David's	2
Litchfield	4	Llandaff	2
Lincoln	4		

All bishops are authorised to confer honorary canonries, without emolument, to the number of twenty-four in each cathedral church.

No canon is, by virtue of his canonry, for the future to possess any separate estate or income, all of which are to vest in the Ecclesiastical Commissioners appointed by 6 & 7 Wm. IV., c. 77. The profits of the suspended canonries are to be paid to the commissioners, in whom their estates, as well as those of non-residentiary prebendaries, &c., are to vest. The dean of Durham is to receive an average annual income of 3000*l.*; the deans of St. Paul's and Westminster, and the warden of Manchester, of 2000*l.* each. The canons of each of those churches, 1000*l.* The dean of every other cathedral or collegiate church in England, an income of 1000*l.*; of St. David's and Llandaff, 700*l.* The canons of every other cathedral church in England are to have 500*l.*; of St. David's and Llandaff, 350*l.* The separate patronage of members of chapters is to be vested in the respective bishops. Provisions are made as to the exercise of the patronage of chapters. And it is made unlawful for any spiritual person to sell or assign any patronage or presentation belonging to him by right of his office. The minor canons are to be appointed by the chapter.

PREBENDARY ('Prebendarius'), one who has a prebend [Prebend], a canon endowed with land or an advowson or tithe. In right of his prebend, he possessed an estate. He was bound by canon 42 to reside four score and ten days during each year in the church to which he belonged. The time fixed by 3 & 4 Vic., c. 3, is three months. The number of prebendaries varies in different churches. The whole body attached to each, together with the dean, forms a corporation aggregate, called the dean and chapter. Each prebendary, having a distinct estate, is, by virtue of that, a sole corporator, as well as member of the corporation aggregate. The office of the dean and chapter is to consent to the grants, leases, &c. of the bishop. Antiently they formed his council, as they still do nominally. On his death they certify the king of it in chancery, upon which a congé d'elire is issued. During the vacancy, they govern the diocese and guard the spiritualities of it, unless where the archbishop has that right by prescription. Prebendaries were bound by canon 43 to preach in their churches, and in other churches in the diocese, especially those whence their profits proceeded, or to substitute other preachers approved by the bishop. A prebendary could not make a grant, &c., until after installation and induction. [DEAN; CHAPTER.] (*Termes de la Loy*, tit. 'Prebend,' 'Chapter;' *Com. Dig.*, tit. 'Ecclesiastical Persons.')

PRECEDENCE, one of the artificial distinctions among men living in a state of political society. In all countries the great mass of mankind will be of one level, no individual possessing political privileges which do not belong to the rest, except as pertaining to some particular employment in the various ordinary businesses of life in which each individual is engaged. But these give no precedence of one before another; all move on abreast. But above these are certain persons, such as the members of the liberal professions, persons who hold or have held offices in the state, peers, who take precedence of the rest, and who are allowed to do so, if not by any law absolutely promulgated, yet by the constant usages of society. And again, the individuals, who may form perhaps the thousandth part of the whole community, who possess this privilege of precedence, have the precedence amongst each other regulated according to usage, or, in other words, by the precedents established in records of former arrangements. The subject is one to which a good deal of attention has been paid, and it is now only as an incident to the creation of new courts or officers, or in singular positions of the royal family, that difficulties arise. The members of the College of Arms, who are the council of the earl-marshal of England, are usually referred to in questions of precedency; and to them is assigned the arrangement of public processions, as at royal marriages, funerals, coronations, and the like, when it is that questions of this kind come to be considered.

Tables of precedency may be seen in many books, and especially in those called peerages.

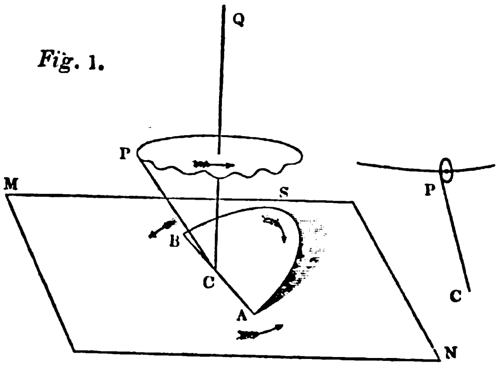
Sometimes the question arises among ambassadors who shall enter a room or depart before another, and great tenacity has at times been manifested in supporting the claims to rank of the state or kingdom represented. In the 'Philoxenis' of Sir John Finet there are some almost ridiculous instances of the struggles made for precedence by ambassadors of the state of Venice in the reign of James I.

PRECESSION AND NUTATION, the abbreviated way of expressing the precession of the equinoxes and the nutation of the earth's axis.

These phenomena should always be considered in connection with the rotation of the earth, of which they really form a part; that is to say, diurnal rotation, precession, and nutation are the motions of the earth about its centre, independently of the motion of that centre along its orbit round the sun. It will assist our comprehension of the subject to suppose the earth's centre a fixed point, the relative motions of the heavenly bodies being adjusted accordingly. [MOTION.]

The rotation of the earth round its axis is visible from hour to hour by the change of place in the stars: the precession and nutation are motions of too slow a nature to be rendered visible, and indeed could hardly be made so unless the ecliptic and equator were visible circles. If such were the case, and if the motions were large enough, the equinoxes, or intersections of the equator and ecliptic, would appear to change place, the equator moving slowly round the ecliptic with a retrograde motion, that is, contrary to the annual course of the sun. The equinoxes would appear to move with a variable motion, sometimes a little faster and sometimes a little slower than the mean motion. At the same time the equator would appear to swing backwards and forwards to and from the ecliptic, turning upon the equinoxes as pivots. Of these motions the average motion of the equinoxes upon the ecliptic is the precession; the alternate acceleration and retardation is one part of the nutation; and the alternate increase and diminution of the angle contained between the two is the other part. It is however common to call the acceleration and retardation of the motion of the equinoxes by the name of the equation of the equinoxes, and to reserve the name of nutation for the motion of the pole which corresponds to it.

Fig. 1.



Let C be the centre of the earth, CP half its axis, P the north pole, and ASB half of the equator. Let MN be part of the plane of the ecliptic, and CQ a line perpendicular to it, pointing therefore to the pole of the ecliptic in the heavens; and let the direction of the diurnal rotation be that of the arrow marked on the equator. If then P were carried uniformly round a circle perpendicular to CQ, so that CP should describe a conical surface, the equinoxes B and A would be carried round in a direction contrary to that of the diurnal motion, and with them the equator BSA, the angle which the equator makes with the ecliptic remaining unaltered. This motion of B and A is the precession. But suppose that instead of P being placed on the circle, it is placed on the circumference of a small oval, which has its centre on the circle. While the centre of the oval moves forward on the circle with the motion of precession, let the pole P move round the oval with a motion much slower than that of the precession. It will then trace out in space an undulating curve, as shown in the principal diagram, and the effect will be an alternate retardation and acceleration of the motion of the equinoxes along the plane of the ecliptic, together with a vibration of the plane of the equator to and from the ecliptic; which are the motions described as constituting the nutation.

The preceding is a description of the effect of any one of the heavenly bodies, theoretically speaking, upon the axis of the earth. The whole precession and nutation is the united effect of the sun, moon, and planets. The effect of the planets however is insensible, except in a slight annual alteration of the plane of the ecliptic, which is mixed up with the precession, and makes it appear a very little smaller than it would be if the system of the sun, moon, and earth were undisturbed by the planetary attraction. The general reader need only attend to the main phenomenon, namely, that the equinox (the point of the heavens at which the sun is at the commencement of spring) moves slowly* backwards along the ecliptic, at the rate of 50¼ seconds per annum, or about 14° in one thousand years. This rate of motion is subject to a very slow increase, which is not perhaps sufficiently well determined to make it worth while to compute exactly the time in which the equinox describes the whole heavens, a period of between twenty-five and twenty-six thousand years.

A good notion of precession may be got from observing the spinning of a top. As long as the axis of the top is not vertical, this axis itself revolves, but much more slowly than the top revolves round its axis. Let the top be supposed to remain with its axis at one angle to the vertical, except only a slight balancing motion to and from the vertical, and let the conical motion of the axis be slightly accelerated and retarded; this will give a complete notion of the phenomena of precession and nutation.

Before proceeding to the mathematical and physical description of these phenomena, we shall show the manner in which they may have an historical and chronological importance. Let the reader take a globe or a map of the stars, he will see that the ecliptic crosses the equator under the tail of one of the Fishes, so that the vernal equinox is nearly in a line with the stars α Andromedæ and γ Pegasi (Alpherat and Algenib). These stars then are invisible at the beginning of the spring, being in the region of the heavens nearest to the sun. Let from twelve to thirteen thousand years elapse, and the slow precessional motion of the equinoctial points will reverse the positions of the equinoxes, so that the above-named stars will be near the meridian at midnight at the commencement of spring, as the stars in the head of Virgo are now. An Aratus of our day would celebrate the brightness of Virgo in the nights of spring, while one of thirteen thousand years hence must choose Pisces for that purpose. The seasons of the year at which different stars begin to be distant enough from the sun to shine brightly is undergoing a gradual alteration. Hesiod, for instance, says that in his time and country Arcturus rose at sunset in sixty days after the winter solstice; Newton calculated that this took place about B.C. 870, which is one of his reasons for supposing that the poet was alive about that time. The phenomenon however is itself rather vague, and Hesiod may be supposed not very exact in his description. It is generally considered that Newton attached too much importance to such data in settling his system of chronology.

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* It will perhaps be more intelligible to imagine all the stars moving slowly forwards in parallels to the ecliptic, the equinox remaining unchanged.

About two thousand years ago the equinox was twenty-eight degrees more advanced among the signs, and was near the beginning of the constellation Aries. It was about this time that the precession of the equinoxes was discovered by Hipparchus [ASTRONOMY; HIPPARCHUS], and since that time the vernal equinox has preserved the title which it properly held at the time when its motion was discovered, namely, the first point of Aries. Certain astronomical fictitious constellations have been made to move with the equinox, at least until lately; counting from the equinox, the first thirty degrees of the ecliptic have been always called Aries, the second thirty Taurus, and so on. Thus when an astronomer of the middle ages asserts the longitude of a star to be ♎ 18° 22′, he means that it is in 18° 22′ of the astronomical Libra, a constellation supposed to begin at 6×30° or 180° distance from the vernal equinox. An astronomer of our day would say the star's longitude was 198° 22′.

Taking the beginning of the year 1750 as the starting point (as is generally done since the publication of the Mécanique Celeste), and calling t the number of years elapsed, the whole motion of the equinoxes from precession, including the effect of the planetary action on the ecliptic, is

$$50''\cdot176068\ t + 0''\cdot0001221483\ t^2,$$

while the precession in one year is

$$50''\cdot176068 + 0''\cdot0002442966\ t.$$

M. Bessel substitutes 50″·21129 for 50″·176068.

The obliquity of the ecliptic, assumed at 23° 28′ 18″ in 1750, is

$$23^\circ\ 28'18'' - 0''\cdot48368\ t - 0''\cdot00000272295\ t^2;$$

its yearly diminution, arising from the planetary action, independently of nutation, being

$$0''\cdot48368 + 0''\cdot0000054459\ t.$$

M. Bessel takes 23° 28′ 17″·63 for the obliquity in 1750, and uses 0″·457 instead of 0″·48368.

The nutation affects both the place of the equinoxes and the obliquity of the ecliptic. Let the effect upon the former, called the equation of the equinoxes, be E; and that on the latter O. Let ☊ stand for the mean longitude of the moon's ascending node, ⊙ for the sun's true longitude, and ☽ for the moon's true longitude. The formulæ which express E and O are of the following form:

$$E = -A \sin \Omega + B \sin 2\,\Omega - C \sin 2\,\odot - D \sin 2\,\text{☽}$$
$$O = a \cos \Omega - b \cos 2\,\Omega + c \cos 2\,\odot + d \cos 2\,\text{☽}$$

The values of A, a, &c., depending upon the moon's mass as compared with that of the earth (an element which has caused some discussion), have been given in a slightly different manner by different astronomers. We subjoin their values according to Laplace, Brinkley, and Littrow; the two former as cited by Mr. Baily, the latter from Kreil's 'Sammlung der Nothwendigsten Mathematischen Formeln.'

	Laplace.	Brinkley	Littrow.		Laplace.	Brinkley.	Littrow.
A	18″·0377	17″·298	18″·89	a	9″·648	9″·250	10″·11
B	0″·21707	0″·208	. .	b	0″·09423	0″·090	. .
C	1″·13645	1″·255	0″·97	c	0″·49333	0″·545	0″·42
D	0″·21632	0″·207	0″·22	d	0″·0939	0″·090	0″·09

It thus appears that by far the largest part of the effect of the nutation arises from the moon, and depends not upon the place of the planet, but upon that of its node. This node [MOON] performs a complete regressive revolution in about eighteen years and a half, in which time the main effect of nutation goes through all its changes. Bradley, the discoverer of the nutation, found out and assigned the law of its largest term; the remaining ones are due to the theory of gravitation. It took him twenty years of observation, somewhat more than the whole period of the change, to detect the law of the anomaly whose existence he became sensible of immediately after his discovery of aberration had cleared away the largest part of the then unexplained motions of the stars. The discovery was completed and published at the end of 1747. In 1749 appeared the 'Recherches sur la Precession,' &c. of D'Alembert, in which the phenomenon was shown to be the necessary consequence of the moon's attraction upon the earth. Newton had already, in the 'Principia,' given the general explanation of the subject, and had even foretold, without assigning magnitudes, the existence of those terms of nutation which depend upon twice the true longitudes of the sun and moon; but the most important terms, those depending on the moon's node, appear to have been altogether unsuspected by him.

We now come to such a physical explanation of the cause of precession and nutation as can be given without mathematical analysis. On looking at the motion of the equator arising from precession and nutation, we see that it precisely resembles in character some of the alterations which take place in a planet's orbit, the precession answering to the regression of the nodes, the equation of the equinoxes to the variation of that regression, and the remaining part of the nutation, or the variation of the obliquity, to the variation of the inclination to the ecliptic. It was soon seen by Newton, that on the supposition of the mutual attraction of all the particles of matter, the action of the heavenly bodies on the protuberant parts of the earth must produce exactly that sort of effect on the motion of the equator which the disturbing force of the sun, for instance, produces on the moon. He thus explains, firstly, the precession; secondly, that part of the nutation of the inclination which depends upon twice the longitude of the disturbing body. This explanation (prop. 66, corollaries 18-22) is substantially as follows:—

If a sphere in rotation be attracted by another body, the axis of rotation must remain unaltered: for since a plane drawn through any attracting point and the centre of the attracted sphere cuts the sphere into two perfectly similar halves, there is no effect upon the rotation (or tendency to an effect) arising from the attraction upon one half of the sphere which is not destroyed by the tendency to the exactly opposite effect arising from the attraction upon the other half. If then the earth were a perfect sphere, whatever motion of translation the whole sphere might receive, the axis would always remain parallel to its first position, and there would be neither precession nor nutation. Again, let the earth be a solid of revolution, protuberant for example at the equator, as is the case, and let an attracting point be situated in the plane of the equator; the symmetry just alluded to still exists, and the result is the same. But if an attracting point be not situated in the plane of the equator, the plane passing through the attracting point and the centre divides the spheroid into parts which, though equal, are no longer similarly situated with respect to the attracting point. The alteration of the axis which would take place if one half only were attracted, is no longer counterbalanced by the attraction on the other half: the direction of the axis is therefore continually changed.

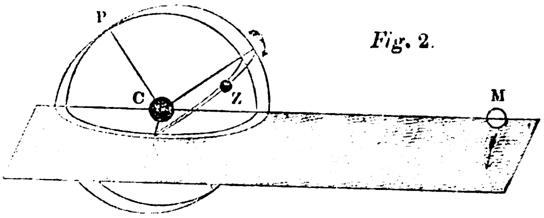

Fig. 2.

To get a specific idea of the nature of the change, first suppose the spherical part of the earth only to exist, the protuberance being removed; and the solidity of the sphere still remaining, let all its matter be supposed to be removed to the centre at C (*Fig.* 2). The diagram shows the spheroid of the earth, distinguishing the inscribed sphere from the protuberant part; the solidity of both parts is supposed to remain, but the matter of the internal sphere is removed to

C, that of the protuberant part is not yet introduced: M is the attracting body, and the plane of its orbit is given, while the directions of the earth's rotation and of M's orbital motion are denoted by arrows. At present M produces no effect on the rotation; now let a small mass of matter be affixed to the equator at Z, which will therefore move round the mass C in and with the equator. The consequence will be [GRAVITATION, section viii., vol. xi., p. 393], that the node of this orbit (the equinox A) will regress, or move in the direction opposite to that of the arrows, while the inclination of the orbit will alternately increase and diminish, being greatest when the line C M passes through one of the equinoxes. If we put such satellites all round the equator, the effect will not be altered in quality, but increased in magnitude; and if we fill up all the protuberant part of the spheroid, the effect will still be of the same sort, though further increased in magnitude. The effect of the parts of the protuberance nearer to the pole is, for a given mass, less than that of the parts near the equator. Finally, if we restore the mass of the internal sphere to its proper place, the effect will be less than before; for since no motion of the protuberant part can take place without one of the whole sphere, and since rotation is more difficult to produce, the greater the distance of the masses moved from the axis, the distribution of the mass at C over all parts of the sphere will render M less efficient in the alteration of the direction of the axis. Thus it appears that the phenomena of precession and nutation *may* arise from the consideration of the protuberant part of the spheroid as a fixed satellite to the internal part; but the proof that the precession and nutation *do* so arise consists in taking a strict mathematical process, investigating the precession and nutation in quantity as well as quality, and showing that the results agree with those of observation.

But, as before noticed, the largest part of the nutation depends, not on the place of the moon in its orbit, but on the position of the orbit, that is, on the node of the orbit. Supposing the moon's orbit circular, imagine the mass of the moon to be distributed in a ring all round its orbit. If this ring were simply to revolve in its own plane, the precession and nutation produced by it in the earth, though materially altered in quantity, would be of the same sort as before, and in both cases very small. But suppose the ring to shift its position, as does the moon's orbit, its nodes slowly regressing at the rate of a revolution in eighteen years. This shifting of the position of the ring will of course produce an alteration in the phenomena, and the substitution of the moon revolving in a shifting orbit in place of this ring must now be made. That the effect of the change of the orbit should be greater than that of the planet itself in a fixed orbit ought not to be surprising, since there is no à priori reason why it should be either greater or less.

Throughout the solar system there is no action of one planet upon a second, without a corresponding action of the second upon the first. The protuberance of the earth, by which the planets produce precession and nutation, attracts those planets, and slightly varies their motion. In the case of the moon, sensible irregularities, both in longitude and latitude, amounting at the maximum to about 7″ in each, were found by Mayer, before Laplace showed them to be the consequences of the earth's protuberance. These inequalities may be made the means of calculating the amount of that protuberance, or, as it is technically called, the ellipticity of the earth: and it is a fact not a little remarkable, that the amount of this ellipticity, as calculated from its effect upon the moon's longitude, agrees with the same, as calculated from its latitude, better than actual measurements of the earth generally agree with one another, while both agree very nearly with the best of the latter. This sort of result had been anticipated as to quality by Newton, who showed that the motion of the equinoxes, being retrograde, proves the earth to be protuberant at the *equator*, and that if it had been protuberant at the *poles* (as many then thought was the case), the precession would have been in the contrary direction.

PREDESTINATION is the decree of God by which he has from all eternity predetermined whatsoever shall come to pass. That the whole universe is governed by a fixed plan, and that all events are tending to the accomplishment of certain objects, is a necessary result of the infinite foreknowledge of God, and of his character as the being who 'created all things, and for whose pleasure they both are and were created.' (*Rev.* iv., 11.) To suppose that any events can result either from a necessity or from a chance opposed to the divine will is evidently to assume a limit to the power of the deity. Some theologians have indeed maintained that though God is possessed of the attribute of infinite prescience, yet with respect to some objects he voluntarily forbears to exercise that attribute. But to suppose a voluntary limitation of an infinite power is both absurd in itself and derogatory from the divine character, since for God to limit any of his attributes is for him to make himself less than perfect, and by setting bounds to his knowledge he must lessen his wisdom, and thereby impair his character as the ruler of the universe. This notion also involves another absurdity; for if God wills to be ignorant of anything, it must be because there is something in that thing which it is undesirable to know; and therefore the nature of the thing must be known to God before he can determine not to know it.

In its relation to the present powers and the future state of men, the doctrine of predestination has been the subject of the most violent and entangled controversies. An account of the extreme views entertained on the one hand by Augustin, Calvin, and their followers, and on the other by the Pelagians and Arminians, has been given in the articles ELECTION and PELAGIANISM; but the opinions of Dr. Edward Williams, which, under the name of Modern or Moderate Calvinism, are now generally held by Calvinistic divines, have not been sufficiently noticed in the article Election. Dr. Williams thus defines the predestination of the modern Calvinists:—'What we maintain is, that all mankind are in a state of guilt and sinful imbecility; that God foresaw this from eternity; that he therefore predestinated an adequate remedy in the sacrifice of Christ; that this should be announced to men as commensurate to the evil. We further maintain that there was not in the present state of man any ground of certainty that any one, without preventing gracious influence, would avail himself of the proposed remedy; and therefore that God predestinated, under the direction of infinite wisdom, to influence the hearts of some, that is, those who are finally glorified, to repent, believe, obey, and persevere in a holy course, as the way to everlasting happiness. Heaven is the end, but holy obedience is the way to it. We hold no predestination that separates the end and the means. We do not presume to conjecture à priori who are predestinated to eternal life; but rather infer from the imbecility of man, that if any one is penitent, faithful, diligent, persevering, and finally glorified, these great effects are from the special and distinguishing energy of God; and that whatever he does in time he purposed to do from eternity. This is our predestination.' (Dr. Williams's *Defence of Modern Calvinism*, p. 202.) To the objection that it is inconsistent with the justice of God to decree that some only, out of the whole human race, should be saved, it is replied, that all deserve damnation; and therefore while it is an act of sovereign mercy to save some, it is an act of strict justice to leave the rest to perish.

The greatest difficulty in this doctrine is the supposition, maintained equally by Calvin and the Anti-Calvinists, that election and reprobation are inseparable: that if God has destined some to eternal happiness, it follows as a necessary consequence, that he has destined the rest of our race to eternal damnation. This consequence is denied by the modern Calvinists. 'It takes for granted,' says Dr. Williams, 'what never can be proved, that non-election implies a decree. Non-election is a negative idea, not electing; but to decree a negation is as absurd as to decree nothing, or to decree not to decree. The notion of decreeing to permit involves the same absurdity; for to permit, in this connection, is not to hinder, but to decree not to hinder is the same thing as to decree to do nothing; or, as before, to decree not to decree. The fallacy consists in the supposition that non-election is a positive idea, and therefore requires a positive determination by way of decree.' (Ibid., p. 206.) The same objection holds against the modified form of the doctrine of reprobation, which is called *preterition*, namely, that God decreed to choose some and to pass by the others. It should be carefully observed that the doctrine of election involves no idea of any who are seeking after salvation being denied, repulsed, or hindered.

Another objection to the doctrine of predestination is, that it makes evil to be the result of a divine decree. This again the modern Calvinists deny. They maintain that the limitation of man's powers is not the result of a decree, but a quality which, by the nature of things, is inherent to every created being; and that therefore the defects, and, among others, the sinful defects, which are the consequences of this limitation, do not result from a divine decree.

To the objection that predestination is inconsistent with free will, it is answered, that the actions, even of a free will, must be determined by some cause, either efficient or deficient; and that God foreknows the deficiencies which are the causes of all the evil determinations of the human will, while all its good determinations proceed from himself, as the source of all good.

(Dr. Williams's *Defence of Modern Calvinism*, and *Essay on the Equity of the Divine Government and the Sovereignty of Divine Grace;* Dr. Payne's *Lectures on Divine Sovereignty, Election, &c.*)

PREDICABLES. The term predicable (*κατηγορικόν*, *prædicabile*) is applied in logic to general names, considered as capable of being the predicates of propositions. [On Predication, see ORGANON, p. 3.] The classes of predicables usually recognised by logicians are five, viz. 1, Genus; 2, Species; 3, Differentia; 4, Proprium; 5, Accidens, which Latin names are translated from the Greek, 1, *γένος*; 2, *εἶδος*; 3, *διαφορά*; 4, *ἴδιον*; 5, *συμβεβηκός*.

The five-fold classification of the predicables does not occur in Aristotle's 'Organon,' or any other of his extant writings; and it probably did not occur in any of his lost writings. The word *γένος* is often used by Aristotle to signify a class: we do not however recollect any instance of the use of the word *εἶδος* in the sense of a logical species in his writings. In his 'Nicomachean Ethics,' b. i., c. 4, he applies the word *εἶδος* to the ideas (or supposed archetypal forms of general notions) which were imagined by Plato. The word *συμβεβηκὸς* (or *κατὰ συμβεβηκὸς*) is often used by Aristotle to signify that which is contingent or accidental, in opposition to that which is necessary (*ἀναγκαῖον*).

The earliest work in which the received classification of the predicables occurs, is an 'Introduction to Aristotle's Categories,' written by Porphyry of Tyre, the well-known heathen philosopher of the third century (born 233 A.D.) and the author of other extant works. (Printed in Bekker's 'Aristotle,' vol. iv., p. 1-6; see also the other excerpts to p. 21.) Porphyry states, at the outset of this treatise, that a knowledge of the five predicables is necessary for the proper explanation of Aristotle's work on the categories; and he therefore addresses to a certain Chrysaorius a popular account of them, derived from the antient philosophers, especially the Peripatetics. (Concerning Chrysaorius, see David, ib., p. 18, b. 16.) The five predicables (*αἱ πέντε φωναί*, as they were originally styled) are not however mentioned in Aristotle's work on the categories, as is incorrectly stated in Hermeias, ib., p. 10, b. 14; and it is probable that the 'antient philosophers' alluded to by Porphyry were of considerably later date than Aristotle. An abridgement of Porphyry's treatise on the predicables, by Michael Psellus, of Constantinople, who lived in the eleventh century, has also been preserved; and it is reprinted in the beginning of the small Oxford edition of 'Excerpts from Aristotle's Organon' (Clarendon press, 1802). Concerning Michael Psellus, see Allatius 'De Psellis,' in Fabric. 'Bibl. Gr.,' vol. v.

From this treatise the classification and explanation of the predicables have passed into the various treatises of the Aristotelian logic, and have been repeated in them with some variations and developments, but with little substantial change, up to the present day. (Whateley's *Logic*, part i.)

It appears to us that the explanation of the predicables which is usually given in treatises on logic is infected with realism; that is to say, it implies that there is something in nature, besides individual things, corresponding with general notions. We shall therefore lay before the reader a brief statement of the definitions of the five classes of predicables which seem to us to be the most convenient. The narrowness of the space at our command prevents us from pointing out the differences between these definitions and the definitions which are usually received, and our reasons for preferring the former to the latter.

The name of any proposed class may be called the *species;* for example, man.

The name of any class including this class may be called a *genus*, with reference to the species; for example, animal, with reference to man.

The two preceding heads of predicables are names of classes; the remaining three are names of attributes or qualities.

Differentia is the name of any attribute which belongs universally to the species, and to it alone. For example, the power of ameliorating his condition in successive generations, and the power of using language, as belonging to man. A logical *definition* is composed of the *genus* and the *differentia;* thus, according to the explanation of differentia which has been just given, man would be defined logically by saying that he is 'an animal which possesses the power of using language.'

Proprium is the name of any attribute which belongs universally to the species, but not to it alone. For example, sensation, the power of articulate speech, or memory, as belonging to man.

Accidens is the name of any attribute which may or may not belong to any individual of the species. For example, the colour of the skin in man.

There being nothing external which corresponds to general notions, the principles by which classes may be formed may be chosen at pleasure, according to the purpose which the classifier has in view. On this subject, see further in ABSTRACTION and GENUS.

The introduction of the theory of realism into the received explanation of predicables appears to have arisen from an identification of genus and species with matter and form.

It was thought that the material or essential substratum, or the substance of a thing (that part which, according to the Catholic theology, is changed in the process of transubstantiation), is the genus; and that the outward form or appearance is the species. See a distinct statement to this effect in Porphyrius, p. 3, b. 38, ed. Bekker. It is to be observed, that the same word is used both in Greek and Latin to signify both logical species and form (*εἶδος*, species).

(On the predicables, see some remarks in an able article in the *Westminster Review*, No. 17; and a pamphlet, published at Oxford in 1829, entitled *An Examination of some Passages in Dr. Whateley's Elements of Logic.*)

PREDICAMENTS, or CATEGORIES, are certain heads of general notions or propositions, an inquiry into which is contained in a treatise by Aristotle which stands first in the extant series of his logical writings. [ORGANON, p. 9.] The following are the predicaments, or categories, as classified by Aristotle:—1, substance (*οὐσία*); 2, quantity (*τὸ ποσόν*); 3, relation (*τὰ πρός τι*); 4, quality (*ποιότης*); 5, opposition (*τὰ ἀντικείμενα*); 6, priority (*τὸ πρότερον*); 7, simultaneity (*τὸ ἅμα*); 8, motion (*κίνησις*).

The most important part of Aristotle's treatise on categories is that which relates to *οὐσία*, or substance; since it contains a discussion (and tolerably correct explanation) of the origin of general notions. It proves that Aristotle did not adopt the theory of realism, although realistic expressions and tendencies may be occasionally discerned in his writings. According to modern usage, the subjects discussed in Aristotle's categories would belong to metaphysical rather than logical science.

A copious and accurate abridgement of Aristotle's treatise on the categories may be found in Barthélemy Saint-Hilaire's 'Logique d'Aristote,' tom. i., p. 140-82. See also Ritter's *Geschichte der Philosophie*, vol. iii., p. 76.

PREDICATE. [ORGANON.]

PRE'FET, PREFECT. [DEPARTMENT.]

PREFIX. [LANGUAGE.]

PREHNITE, a mineral which occurs crystallized and massive. Primary form a right rhombic prism. Cleavage easy parallel to the base of the primary form, and less so in the direction of the lateral faces. Fracture uneven Hardness, scratches glass easily. Becomes electric by heat. Colour white, grey, and various shades of green and greenish yellow. Lustre vitreous. Transparent, translucent. Specific gravity 2·926. The variety which occurs in small thin crystals is called *Koupholite*. The crystals of this substance have a remarkable tendency to exhibit rounded faces.

Massive varieties: botryoidal, globular, and stalactitic, structure broad fibrous; amorphous, structure granular, compact, with rough surfaces. It occurs also in rolled masses.

Before the blow-pipe it is converted into a white scoria, and fuses into a compact globule; with borax it readily becomes a clear glass.

This mineral was first found at the Cape of Good Hope; it has since been met with in many places in different quarters of the globe, as Scotland, Cornwall, France, &c. Koupholite occurs at Barèges, department des Hautes-

Pyrénées. The annexed analyses of Koupholite are by Vauquelin (1) and by Laugier (2):—

	(1)	(2)
Silica	48	42·50
Alumina	24	28·50
Lime	23	20·40
Oxide of iron	4	3
Potash and soda	—	0·75
Water	—	2
	99	97·15

PRELATE (etymologically from *præ* and *latus*), a person *preferred* or advanced before another; but it is confined to a particular species of preferment or advancement, namely, that amongst the clergy, and it is applied to those only among them who have attained the very highest dignity, that of bishop or archbishop, to which we may add *patriarch*, in such churches as have an officer so denominated. The word prelate has however in antient times been applied to simple priests, members of the clerical body in general.

PRELUDE (*Præludium*, a preamble), a brief introduction to a piece of (most commonly) piano-forte music; a few chords, or a flourish, to prepare the hand of the player, and draw the attention of the auditors to what is to follow. A prelude is, or is supposed to be, an extemporaneous effusion, and as such is no bad test of the musical knowledge of the performer.

PREMISES. [ORGANON.]

PRE'MIUM (in the sense in which it is used in the article BOUNTY) is a reward given out of the public revenue to encourage manufactures or other branches of industry; but prizes given by agricultural and other societies are in reality the same thing as premiums. Premiums encourage and reward competition; but when it is proposed to foster any new art by liberal premiums, there is less certainty of an interest thus sustained establishing itself upon the only natural foundation—that which arises from the encouragement of the public; and premiums then fall under the same objections as bounties. These objections are inseparable from a system of bounties, but the judicious distribution of premiums may occasionally be attended with advantage. Adam Smith says of premiums that 'by encouraging extraordinary dexterity and ingenuity, they serve to keep up the emulation of the workmen actually employed in those respective occupations, and are not considerable enough to turn towards any one of them a greater share of the capital of the country than what would go to it of its own accord. Their tendency is not to overturn the natural balance of employments, but to render the work which is done in each as perfect and complete as possible. The expense of premiums, besides, is very trifling; that of bounties very great.' (*Wealth of Nations*, book iv., chap. 5.)

PREMNA, a genus of plants of the natural family of Verbenaceæ, which is characterised by a cup-shaped calyx, a 5-cleft bilabiate corolla. Stamens 4, didynamous. Drupe pea-shaped, with a four-celled nut. The species consist of shrubs and small trees, which are indigenous in Asia and New Holland, having opposite leaves, inflorescence in terminal cymes, with small flowers.

The majority of the species are remarkable for the fetid odour of their leaves, though those of P. cordifolia are somewhat fragrant, and those of P. esculenta are employed as diet by the natives of Chittagong. P. integrifolia has roots of a burning taste, with leaves of a hircine odour. The leaves, applied to the head, are said to cure headache, and a decoction of the roots is employed as a stimulant in fevers, flatulence, &c. P. latifolia has wood of a white colour and firm texture, employed for various economical purposes, in which it agrees in character with the teak tree, Gmelina arborea, and others which belong to the same natural family.

PREMONSTRATENSIAN ORDER. The Premonstratensians were canons who lived according to the rule of St. Austin, as reformed by St. Norbert, afterwards archbishop of Magdeburg, who set up this regulation about A.D. 1120, at Premonstratum in the diocese of Laon in Picardy, a place so called because pointed out, as it was said, by the blessed Virgin to be the head of this reformed order.

These canons were also called *White Canons* from their habit, which was a white cassock with a rochet over it, a long white cloak, and white caps. They were brought into England shortly after A.D. 1140, and settled first at Newhouse in Lincolnshire. They had in England a conservator of their privileges, but were nevertheless often visited by their superiors of Premonstre, who raised great contributions out of them, as the generals or foreign heads of the Cluniacs or Cistercians also did from their order, till restrained from it by the parliament of Carlisle, in the last year of Edward I., A.D. 1307. This statute did not restrain the foreign heads from visiting their charge in England, governing their monks, or exercising the discipline of their order, provided they carried no money away with them. So that the religious of this order in England continued under the jurisdiction of the abbot of Premonstre and the general chapter of the order till A.D. 1512, when they were exempted from it by a bull of Pope Julius II., confirmed by King Henry VIII., when the superiority of all the houses of this order in England and Wales was given to the abbot of Welbeck in Nottinghamshire. Tanner reckoned about thirty-five houses of this order in England.

(Tanner, *Notit. Monast.*, pref., p. xi.; Dugd., *Mon. Angl.*, new ed., vol. vi., p. 856.)

PREPOSITIONS are certain words which express a relation between different things. All words may be divided into notional and relational. [NOTION, NOTIONAL.] Notional words are those which express notions, and which are objects of the understanding. Relational words are those which merely express a relation between the different things which are expressed by notional words. Thus, in 'he went *to* town,' 'he walked *with* his friend,' the words *to* and *with* are relational words, that is, they connect the notions of 'he went' and 'he walked' respectively with the notions of 'town' and 'friend.'

Harris defines a preposition 'to be a part of speech devoid itself of signification, but so formed as to unite two words that are significant, and that refuse to coalesce or unite of themselves.' This definition has been attacked by Horne Tooke, who considers it absurd to imagine that men, in the formation of any language, would invent words without some meaning, and to which singly they attached no determinate idea, and he accordingly endeavours to show that every preposition was originally a verb or a noun. To a certain extent however both these writers are correct, since, according to Harris, prepositions are usually only used to unite words that are in themselves significant, that is, they are only relational words; but, at the same time, there can be no doubt that Horne Tooke is right in contending that prepositions were originally significant, since all words which now merely express relations appear to have been originally notional words.

Prepositions are so called because they are *preposed* or prefixed to the words with which they are connected; but the name is an unfortunate one, since they are sometimes *postponed* or placed after such words, as in *wherewith*, *wherein*, *wherefrom*, *thereby*, &c. In languages like our own, which have hardly any inflections, the relation which one thing bears to another can only be expressed by means of prepositions; but in languages which possess inflections, like the Latin and Greek, the same relation may frequently be expressed by means of cases, which are in fact prepositions placed at the end of nouns. Thus, in the expression 'the son *of* the king,' we express the relation between 'son' and 'king' by the preposition 'of;' while in Latin the same relation is expressed by *is* placed after the Latin word for king, *filius reg-is*. But as the meaning of these case-endings was not always definite enough, it became customary to mark the relation more precisely by prefixing certain words, as in our own language. The case-endings however were not dropped; so that in such expressions as *ad urb-em*, *cum reg-e*, *pro reg-e*, the noun may be said to have two words to mark relation, one placed before and the other after it.

The number of prepositions differs, as might be expected, in different languages. The Greek grammarians admit only eighteen, the Latin about fifty. In English the following words are usually considered as prepositions:—Above; about; after; against; among, amongst; amid, amidst; around, round; at; between, betwixt; beyond; before; behind; beneath; below; beside; by; down; for; from; in, into; near, nigh; of; off; over; on, upon; since; through, throughout; till, until; to, unto; toward, towards; under, underneath; up; with; within; without.

Besides these prepositions, there are in English, Latin, Greek, and many other languages certain particles never found singly, or uncompounded, and which are therefore called inseparable prepositions, as in English *be, for, fore, mis*, &c., which occur in such words as *be-stir, be-speak; for-bid, for-sake; fore-see, fore-know; mis-take, mis-deed*, &c.

PREROGATIVE, a word descended to us from the times of the Romans, or, rather, adopted from their language, to denote a certain power in the constitution of monarchical states. Its etymology is obvious, though the formation is not perhaps quite accordant with the analogies. *Præ* and *rogo* would seem to give the sense of precedence in asking, while prerogative means precedence in being asked, the right of having the consent first obtained of the party in whom the prerogative is vested, before any change shall be made in the matters comprehended within the prerogative. The term is confined to cases of dignity, to things indeed which affect the common interest when men are bound together in a political state; and though we might speak, as indeed men sometimes do, of the prerogative of the House of Lords, or the prerogative of the House of Commons, or even of the prerogative of the people, it is more usual to regard the word as belonging to the right which the king possesses of being consulted, and his consent obtained, in whatever concerns the business of the nation.

Thus the consent of the king (or queen regnant) must be first obtained before any new law can be made, or any change in the laws at present existing, and this appears to be prerogative in its purest state, and, indeed, in its only state of absolute purity. Other things which are now understood to be comprehended under the term prerogative, are only accretions to this the true prerogative, or things which have naturally shot forth out of it: unless we choose to take a view of the whole subject which shall take it wholly out of the scope of the etymological sense, and regard, as indeed many do, the word prerogative as standing to indicate the primordial and original power of any prince, the king of England for instance, which has been from time to time reduced and confined by the resistance, passive or active, of the subject. However the term may be chosen or applied, it now denotes not only the privilege of being consulted in any intended change of the law, and the consent obtained, but the right of making war or peace, of laying embargos, of commissioning officers in the army and navy, of sending and receiving ambassadors, of making treaties, of bestowing honours, conferring rank, and creating peers. To these are to be added the regulation of the coinage and of weights and measures; the pardoning of offenders, which is sometimes called the exercise of the prerogative of mercy; the calling, proroguing, and dissolving parliament, in which however the king's prerogative has been restrained by positive enactments; and, lastly, various rights which the king enjoys in respect of his position as head of the church. All these things the king (queen) does by his prerogative, his own sole will, without any application to parliament, or to any court or council whatever, though members of the Privy Council, those particularly who form what is called the Cabinet Council, or the ministers, are supposed to advise the king in the exercise of his prerogative, and are sometimes made answerable by parliament for the injudicious or dangerous exercise of it. Theoretically however and nominally, these are prerogatives of the king himself—rights inherent in him in virtue of his office, as much his as the subject has certain rights belonging to him, either as a member of the great community of Englishmen, or as belonging to some particular section to which he belongs, or to some particular office in which he is placed. In the mutual respect of each, and the forbearance of each to encroach on the rights or prerogatives belonging to each other, lies the balance of the English constitution; and out of it arises security to all, and the enjoyment of the blessings which belong to a well-ordered political community. When evils are perceived, when the subject claims rights which are incompatible with wholesome government, or when the king claims rights as falling within the scope of any part of his prerogative which are opposed to the common good, there are remedial powers in the constitution which bring things right; and it is one of the most important functions of the two houses of parliament to see to this.

PREROGATIVE COURT, a court held by each of the archbishops (or their officials) of England and Ireland, by virtue of his prerogative, for the purpose of trying the validity of wills, registering them, and granting probate or administration. Its jurisdiction attaches where one dies possessed of bona notabilia, that is, of goods to the value of 5*l.* (except in the diocese of London, where it is 10*l.*) in one diocese or peculiar, and also goods, altogether of the same amount, in some other diocese or dioceses, peculiar or peculiars, within the same province; or where one, not being on a journey, dies in one diocese or peculiar, possessed of goods of that amount in another diocese within the same province. A peculiar is a district exempt from the jurisdiction of the ordinary of the diocese wherein it lies. By means of the Prerogative Court, one administration becomes sufficient; and the inconvenience and uncertainty of taking out administration in various dioceses, &c. are avoided. Where a person dies out of a province, leaving bona notabilia in one of its dioceses exclusively, the prerogative and diocesan courts have concurrent jurisdiction. A probate of the will of a bishop must in all cases be prerogative. A prerogative probate granted where there are not bona notabilia in several dioceses, &c., is only voidable; but a diocesan probate, where there are, is absolutely void. (4 *Inst.*, 335 Williams *On Executors, &c.*)

PRESBURG, *Posonium* (in Hungarian, *Posony*), once the capital of Hungary, is situated on the north bank of the Danube, in 48° 8′ N. lat. and 17° 10′ 45″ E. long. It is built on a hill of moderate height, commanding a fine view over an extensive plain watered by the Danube, the horizon being open in every direction except towards the north-west, where it is intercepted by distant mountains. The Danube is here 130 toises wide, and is crossed by a bridge of boats 365 paces in length, which was substituted in 1825 for the flying-bridge. The fortifications have been demolished, and the suburbs are no longer separated from the city. It appears to have existed in the time of the Romans, or at least under the great Moravian kingdom which the Maygars contributed to overthrow. It was chiefly peopled by German colonists, and was an important frontier fortress against the Germans and Bohemians. It suffered severely in the successive wars, as well with those nations as with the Tartars (1241) and the Turks. In 1446, Ofen having fallen into the hands of the Turks, Presburg was declared the capital of the kingdom, and the diets were held here till the year 1784, when Joseph II. decided that the viceroy and palatine, with the high officers of government, should reside at Ofen, as a more central situation. The emperor is however still crowned here as king of Hungary. Presburg, which was formerly not only the handsomest, but the most important and most populous city in the kingdom, is now far surpassed in all respects by Pesth, in political importance by Ofen, and in population by Debreczyn. Including the suburb of Blumenthal, with the Zuckermandel and the Schlossberg (which belong to Count Palffy, and are not properly parts of the city, though commonly reckoned as such), it has a population of 38,800 inhabitants, of whom 8000 are Protestants and 2700 Jews. The trade of the city is neither flourishing nor increasing: the navigation of the Danube has not afforded much advantage, but it is expected that the increasing number of steam-boats that navigate the river from Vienna to its mouth, and thence to Constantinople, will prove very beneficial to Presburg. The principal buildings are—the cathedral, in which the kings of Hungary are crowned; the county-hall, the antient senate-house, the archiepiscopal palace, the palace of prince Grassalkovics, and the theatre. Among the public institutions are a Catholic academy, with a library of 12,000 volumes; a Protestant lyceum, a Catholic gymnasium, a royal national model school, several other schools (one of them an infant-school), an hospital, and the great library of Count Appony, of 50,000 volumes, three monks' convents, and two nunneries. On a hill out of the city, 439 feet above the level of the Danube, are the remains of the royal palace, which, after having been long used as a barracks, was burnt down in 1811, and has not been restored. The German language and manners prevail, together with the Slavonian. There is much agreeable society at Presburg, in consequence of the many magnates and nobles, of officers living on their pensions, of clergy, and professors. The chapter, consisting of twelve canons, is antient, and well endowed. There are various manufactures of woollens, silk, tobacco, snuff, oil, rosoglio, and some tanneries, but all on a small scale. The environs of Presburg are very agreeable, and there are numerous places of amusement and public resort. One of the remarkable spots is an artificial hill, or mound, of inconsiderable height, to which the king of Hungary rides after his coronation, and brandishes a naked sword towards the four cardinal points, to intimate that he will defend the kingdom against its enemies, from whatever quarter they may come.

(Jenny, *Handbuch;* J. von Thiele, *Das Königreich Ungarie;* Blumenbach, *Gemälde der Oesterreichen Monarchie;* Hassel; Stein; &c.)

PRESBYTERIANS (πρεσϐύτερος, an elder) are professors of the Christian religion who believe that there is no order in the church, as established by Christ and his Apostles, superior to that of Presbyters; that all ministers, being ambassadors of Christ, are equal by commission; that Presbyter or Elder, and Bishop, are only different names for the same person; and that Deacons are laymen whose office is chiefly to take care of the poor. A Presbytery (πρεσϐυτέριον) they regard as a society of clerical and lay Presbyters, or, as they usually call them, Ministers and lay Elders. In support of these opinions they allege several passages of the New Testament. They affirm that the primitive form of church government was universally Presbyterian, and that this form, having, after the time of the Apostles, been supplanted by Episcopacy, was restored in some parts of Europe after the Reformation had begun.

The most noted Presbyterian Church of the present day is that of Scotland, which is called the Kirk, of which we shall here furnish a short account.

Presbyterianism was introduced into Scotland about 1560. Under Calvin's direction this discipline had already been put into operation at Geneva, whence it was brought by John Knox into his native land, though not in precisely the same form as that which was afterwards given to it. King James I., who had been a Presbyterian in Scotland, and who embraced Episcopacy upon coming to the English throne, made Episcopacy, nominally at least, the religion of Scotland. In the reign of Charles I. Presbyterianism regained the ascendency, but Episcopacy was once more declared the established religion at the restoration of Charles II. At the Revolution in 1688, Presbyterianism was reestablished in Scotland by authority of Parliament, and thus it has continued to the present time.

The constitution of Presbyterianism in Scotland is as follows:—The Kirk Session, consisting of the minister and lay or ruling elders of a parish or congregation, is the lowest court of judicature, the minister being, ex officio, the moderator or chairman. This Kirk Session has power to cite before it any members of the congregation, and to examine, instruct, rebuke, admonish, and suspend them from the Eucharist. The Presbytery is next in authority, and consists of all the ministers of a certain district, and one ruling elder from each parish, who is chosen half-yearly. At the meeting of a Presbytery, a moderator is chosen out of the ministers. There are 69 Presbyteries, each consisting of parishes in number not more than 24 nor fewer than 12. The Provincial Synods, of which there are 15, meet twice in the year, and are composed of the Presbyteries within the provinces which give name to the Synods. The highest authority is the General Assembly, which meets annually. This is composed of delegates from each Presbytery, from every royal borough, and from each of the Scotch universities, and the president is a nobleman who represents the person of the king, and who is called the Lord High Commissioner. In all matters of dispute the appeal lies from the Kirk Session to the Presbytery, from this to the Provincial Synod, and from the Provincial Synod to the General Assembly. Persons are appointed ministers by the laying on of the hands of the Presbytery. The maintenance of the clergy is regulated by the state, and they are nominated to livings by patrons. The Kirk has no Liturgy, no altar, and no instrumental music. Its doctrine is Calvinistic. At the Revolution the Westminster Confession was appointed the standard of the national faith, and it was enacted that no person should be admitted or continued a minister or preacher in this church, without subscribing to this Confession of Faith as his faith. By the Act of Union in 1707, the same subscription is required of all professors, principals, regents, masters, and others bearing office in any of the four universities of Scotland.

There are however many Presbyterians in Scotland who do not belong to the national establishment, and who are called Seceders. But they maintain the same articles of faith as the members of the Kirk, and hold Associate Synods for regulating matters of discipline. They secede, because they suppose the Kirk to be in a state not consistent with its acknowledged principles.

The first Presbyterian congregation in England was formed at Wandsworth, near London, in 1572. In the reign of Charles I., 1645, it was proposed, in the treaty of Uxbridge, to make the Established Church of England Presbyterian, and the proposition was carried into effect by way of trial in 1646. In 1649 the Presbyterian discipline was sanctioned by parliament, and the Established Church was Presbyterian till Episcopacy was restored with the restoration of Charles II. in 1660.

There are still congregations in England called Presbyterian; but in both doctrine and discipline they differ materially from the Scottish Presbyterians. 'The English Presbyterians, as they are called,' says one of their writers, 'adopt nearly the same mode of church government with the Independents. Their chief difference from the Independents is, that they are less attached to Calvinism, and consequently admit a greater latitude of religious sentiment.'

(Broughton's *Bibliotheca Historico-Sacra;* Williams's *Dictionary of all Religions.*)

PRESCOT. [Lancashire.]

PRESCRIPTION. 'No custome is to bee allowed, but such custome as hath been used by title of prescription, that is to say, from time out of mind. But divers opinions have been of time out of mind, &c. and of title of prescription, which is all one in the law.' (Litt., § 170.) According to this passage, 'time out of mind,' and 'prescription,' which are the same thing in law, are essential to custom: another essential to custom is usage. But there is a claim or title which is specially called prescription, and which is like custom so far as it has the inseparable incidents of time and usage; but it differs from custom in the manner in which it is pleaded, which difference shows the difference of the right. This claim is called prescription, because the plaintiff or defendant who makes it 'prescribeth that,' &c.; stating, after the word 'prescribeth,' the nature of his claim.

The following is an example of a prescription (Co. Litt., 114, a):—'I S., seised of the manor of D. in fee, prescribeth thus: that I. S., his ancestors, and all whose estate he hath in the sayd manor, had and used to have common of pasture time of mind in such a place, &c., being the land of some other, &c., as pertaining to the same manor.' The claim of a copyholder of a manor for common of pasture in the manor, alleges a custom time out of mind within the same manor, by which all the copyholders of the manor have had and used common of pasture in it. The claim by prescription then is properly a claim of a determinate person: the claim by custom, as opposed to prescription, is local, and applies to a certain place, and to many persons, and perhaps, it may be added, to an indeterminate number, as the inhabitants of a parish. The following definition of prescription appears to be both sufficiently comprehensive and exact:—'Prescription is when a man claimeth any thing for that he, his ancestors, or predecessors, or they whose estate he hath, have had or used any thing all the time whereof no memory is to the contrary.' (*T. de la Ley.*) From this definition it follows that prescription may be a claim of a person as the heir of his ancestors, or by a corporation as representing their predecessors, or by a person who holds an office or place in which there is perpetual succession; or by a man in right of an estate which he holds. It is said that certain persons, attorneys for instance, may prescribe that they and all attorneys of the same court have certain privileges; it seems indifferent whether this is called prescription or custom, but it is more consistent with the old definitions to call it prescription, since it is not a local usage, and it is by or on behalf of a determinate number of persons, that is, all the attorneys of a particular court. It is also said that parishioners may prescribe in a matter of easement, as a way to a church-yard, but not for a profit out of land: such a prescription however is not contained within the above definition, and is in all respects more properly a custom.

It is essential to prescription (subject to the limitations hereinafter mentioned) that the usage of the thing claimed should have been time out of mind, continuous, and peaceable. 'Time out of mind' means, that there must be no evidence of non-usage or of interruption inconsistent with the claim and of a date subsequent to the first year of Richard I., which is the time of the commencement of legal memory. If it can be shown, either by evidence of persons living, by record, or writing, or by any other admissible evidence, that the alleged usage began since the first of Richard I., the prescription cannot be maintained. Repeated usage also must be proved in order to support the prescription, but an uninterrupted enjoyment for twenty years has been considered sufficient proof, where there is no evidence to show the commencement of the enjoyment. [PRESUMPTION.]

The thing prescribed for must be something definite. It must also be reasonable; and it must not be inconsistent with any established principle of law; for instance, it is said that a sheriff cannot prescribe for taking gifts for doing the duties of his office. It follows generally, that there can be no prescription to do any wrong or commit nuisance, or for a thing contrary to a statute. No prescription is good which is against the king's right (subject to the limitations hereafter mentioned), conformably to the maxim, Nullum tempus occurrit regi; yet a grant from the crown may be presumed.

Where a man prescribes for a thing which cannot be granted or aliened without deed, he must prescribe in himself, and in his ancestors, whose heir he is; and he cannot prescribe in himself and those whose estate he hath; for he cannot have their estate without deed or other writing which ought to be showed to the court. But of things appendant to an manor or to other lands or tenements, a man may prescribe that he and they whose estate he hath, have been seised of those things as appendant to the manor or to such lands and tenements time out of mind of man. And the reason is, that such manor or lands and tenements may pass by alienation without deed. (Litt., § 183.)

From the nature of the claim of prescription, it follows that a man cannot make a title to land by prescription, for the evidence of a title to land is quite different from and inconsistent with that of a thing claimed by prescription, which only applies to incorporeal things. A man may prescribe for all franchises and privileges which he may have, without a title appearing on record, as for waifs, estrays, wreck, treasure trove; and to have a park or warren, to have a fair, market, or right to toll, &c.

Nothing can be prescribed for at the present day that may not be the subject of grant; for the allegation of usage time out of mind must be usage of something which could originate in a lawful way. When, then, the claim of prescription is allowed, it is equivalent to admitting that there was an original grant which is now lost. (Luttrel's case, 4 *Rep.*, 86.) It is however no proof of a grant.

A question has been raised whether the same thing may be claimed by prescription and by custom, which is nearly the same thing as saying, whether the same thing could be granted to all the inhabitants of a given place, and also granted to one person in that place, either in gross or in respect of a piece of land; as for instance, whether a private right of way may not exist together with a public right of road. (Blewett *v.* Tregonning, 3 A. and E., 586.) If *all* prescription supposes an original grant, it is an inconsistency to suppose a grant to A, and a grant of the same thing to A and others with him.

There is some confusion in the books as to prescription and custom, and the real distinction between them has perhaps not always been observed. It seems immaterial whether the thing whose origin is unknown is called prescription or custom, for the two incidents of time and usage belong to both. Still there is the distinction as to the persons who claim, which has been already stated; and there is of course a difference in the evidence, which results from the difference in the persons claiming, or in whose right it is claimed.

A prescription may be lost or destroyed in various ways. If the thing in respect of which the prescription is claimed is destroyed, the prescription also is destroyed. A franchise by prescription is destroyed if the same liberties are granted by the king by charter. It may be lost by nonusage. But a prescription is not lost by changes which are immaterial and do not affect the nature of the claim: thus if a man prescribes for a watercourse to a fulling-mill, and he converts it into a grist-mill, he does not lose his right, which is generally to have a watercourse to a mill on a given site. And if a corporation should prescribe, and afterwards have a new name, it would not lose the right. (4 *Rep.*, 86.) When the ownership of the land and of the thing claimed out of or upon it are united in the same person, the prescription is destroyed.

Recent acts have made some alterations as to prescription, and limited the time within which actions can be brought or suits instituted relating to real property. The 3 & 4 W. IV., c. 27, applies to every thing of a corporeal nature, which is land in the sense in which land is interpreted in that act; but it only applies to those kinds of property of an incorporeal nature, which are advowsons, annuities, and rents. The 2 & 3 W. IV., c. 100, applies only to cases of modus and exemption from tithes. The 2 & 3 W. IV., c. 71, which is entitled 'An Act for Shortening the Time of Prescription in certain cases,' applies (§ 1) to 'claims which may be lawfully made at the common law by custom, prescription, or grant to any right of common or other profit or benefit to be taken from or upon any land, &c., except such matters and things as are therein specially provided for, and except tithes, rents and services;' (§ 2) 'to any way or other easement, or to any watercourse, or the use of any water,' &c.; and (§ 3) to the use of light. No claim to the things comprised within this statute 'shall, when such right, profit, or benefit (as is mentioned in § 1) shall have been actually taken and enjoyed by any person claiming right thereto, without interruption for the full period of thirty years, be defeated or destroyed by showing only that such right, profit, or benefit was first taken or enjoyed at any time prior to such period of thirty years; but nevertheless such claim may be defeated in any other way by which the same is now liable to be defeated; and where such right, profit, or benefit shall have been so taken and enjoyed as aforesaid, for the full period of sixty years, the right thereto shall be deemed absolute and indefeasible, unless it shall appear that the same was taken and enjoyed by some consent or agreement expressly made or given for that purpose by deed or writing.' As to the rights enumerated in the second section, the terms of twenty and forty years are respectively fixed in the place of the terms of thirty and sixty years mentioned in the first section. Under the third section, which applies to lights, an absolute right to light may be acquired by twenty years' uninterrupted enjoyment, unless the use has been enjoyed by some consent or agreement made or given by deed or in writing. The eighth section provides 'that when any land or water upon, over, or from which any such way or other convenient watercourse or use of water shall have been enjoyed or derived, hath been or shall be held under any term of life, or any term of years exceeding three years from the granting thereof, the time of the enjoyment of any such way or other matter as therein last mentioned, during the continuance of such term, shall be excluded in the computation of the said period of forty years, in case the claim shall within three years next after the end or sooner determination of such term be resisted by any person entitled to any reversion expectant on the determination thereof.' Formerly it was necessary for all persons who claimed in respect of an estate and had not the fee, to claim in the name of the person who had the fee, but under the last-mentioned act 'it shall be sufficient to allege the enjoyment thereof as of right by the occupiers of the tenement in respect whereof the same is claimed, for such of the periods mentioned in the act as may be applicable to the case, and without claiming in the name or right of the owner of the fee, as is now usually done.'

This statute applies also to 'any land or water of the king, his heirs or successors, or any land being parcel of the duchy of Lancaster or of the duchy of Cornwall.'

By the common law a man might prescribe for a right which had at any time been enjoyed by his ancestors or predecessors; but the statute of 32 Hen. VIII., c. 2, enacted that no person should 'make any prescription by the seisin or possession of his ancestor, unless such seisin or possession hath been within threescore years next before such prescription made.' This statute prevented any claim being made by prescription unless there had been seisin or possession within sixty years; but it still allowed the commencement of the enjoyment at any time within legal memory before the sixty years to be proved. The recent act directs that 'the respective periods of years thereinbefore mentioned shall be deemed to be the period next before[*] some suit or action wherein the claim or matter to which such period may relate shall be brought into question' (§ 4); but it only excludes proof of commencement of enjoyment, and it only gives the absolute right, when the several periods of years, reckoned backwards from the time of some suit or action wherein the matter is brought in question, are completed; and it neither excludes the proof nor gives the absolute right if there has been an interruption, within the meaning of this statute, which has been submitted to or acquiesced in 'for one year after the party interrupted shall have had notice thereof, and of the person making or authorising the same.' In these cases, if there has been seisin or possession of the ancestor or predecessor within sixty years, the statute of Henry VIII. will still apply, and evidence of the commencement of enjoyment within legal memory may still be given.

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[*] Richards *v.* Fry, 7 A. & E., 698.

The acts here enumerated do not apply to a claim 'of a manor, a court leet, a liberty, separate jurisdiction, treasure trove, wreck, waifs, and other forfeitures, fair, market, fishery, toll, park, forest, chace, or any privilege legally known as a franchise, as well as anything pertaining to those rights which come under the description of dignities or offices.' (Mr. Hewlett's *Reply, &c. to certain Evidence before the Select Committee of the House of Commons on Records, February,* 1836.)

The term prescription is derived from the Roman law, but the meaning of the term in the Roman law is different. Blackstone says (iii., c. 17, note F.), 'This title of prescription was well known in the Roman law by the name of usucapio (*Dig.*, 41, tit. 3, s. 3), so called because a man that gains a title by prescription may be said *usu rem capere.*' This remark is not correct. Usucapio in the Roman law was founded solely on possession as such [POSSESSION], and it applied only to 'corporeal things:' 'by the laws of the Twelve Tables usucapion of moveable things was complete in one year; and of land and houses in two years.' (Gaius, ii. 42.) 'To usucapion was afterwards added, as a supplement, the longi temporis præscriptio, that is, an exceptio (plea) against the "rei vindicatio," the conditions of which were nearly the same as in the case of usucapion.' (Savigny, *Das Recht des Besitzes*, p. 6.) The term præscriptio was properly applied to that which a plaintiff (actor) prefixed (præscripsit) to the formula by which he made his demand against a defendant, for the purpose of limiting or qualifying his demand. It seems afterwards to have been used as equivalent to exceptio or plea.

Bracton (ii., c. 22) treats of ownership acquired 'sine titulo et traditione, et per usucaptionem, s. per longam continuam et pacificam possessionem;' but he adds that no time was legally fixed as necessary to make the title perfect, and it depended on the discretion of the justices. It appears then that the rule as to the time of prescription commencing from the first of Richard I. (A.D. 1189) was not established at the time when Bracton wrote, which was in the reign of Henry III. Bracton observes that 'longa possessio,' as above defined by him, 'sicut jus parit jus possidendi et tollit actionem vero domino petenti;' or the actual possession gives in course of time the right to possess. [POSSESSION.] In the same chapter he treats of the mode of acquiring 'possessio rei incorporalis, sicut possessio juris, vz alicujus servitutis per patientiam que trahitur ad consensum, et longum usum et pacificum.' Bracton then makes no distinction between a thing corporeal and incorporeal as to the mode of acquiring right by possession and long usage, nor does he use the word prescription.

(Comyns, *Prescription;* Viner's *Abridgment;* Starkie, *Law of Evidence;* Blackstone, ii., c. 17.)

PRESENTATION. [BENEFICE.]

PRESENTMENT. [JURY.]

PRESS. [PRINTING-PRESS.]

PRESSURE. To explain the use of this term in mechanics we must remember its previous and common use. When we attempt to move matter, or when we sustain a weight, the effect is accompanied by a perception which is called pressure. The sense of touch is nothing but this perception; contact without pressure is not touch, and there are even weights too small to give the sense of touch. A small feather supported on the open palm is not felt, though it would fall to the ground if the palm were removed.

The word pressure is soon indissolubly connected with the notion of motion caused or prevented. Let the obstacle which is pressed suddenly break, and the hand which pressed must follow, unless the person who presses can take an instantaneous warning to cease his effort. Hence, whenever we see motion caused, prevented, or altered, we are apt to carry with us the notion that pressure is exerted. The weight in the scale of a balance is said to press the scale; not that we suppose the scale to have muscles to be acted upon, and nerves to carry news of the action to a living brain, but that we see a counteraction of the known tendency of the weight to fall, and know that if the counteraction were the work of a human agent, that agent would be conscious of the perception of pressure. Hence everything fitted to produce the sensation of pressure, such as a weight, the elasticity of a spring, &c., comes to be called a pressure, and the word loses its meaning of a perception conveyed, and takes that of an agent proper to produce that perception if the human being were situated so as to receive it.

This consideration is not unimportant, for a latent confusion between pressure as a perception, and pressure as a cause proper to produce that perception, has prevented many from a clear understanding of the Newtonian doctrine of gravitation, has caused some to reject it altogether, and has made one or two write books against it. We have in mechanics the word FORCE, which really means nothing but the cause of motion produced, altered, or prevented: but this word force having been used in two distinct senses, namely, both in the sense of pressure and in that of acceleration produced by pressure, it is sometimes necessary to have recourse to the word pressure instead of force where precision of language is required. The motion of the planets is continually altered: there must be a producing cause of that alteration, a force, an agent proper to produce the sensation of pressure in a human being who should interfere with it, if such a thing could be; or, in common language, a pressure. If it is found that the laws of alteration in a planet's motion are such that the pressure must always be directed towards the sun, and if we thence say that the sun attracts the planet, or pulls the planet towards it (pull and pressure being the same terms, or at least only differing in their original meaning by this, that a pull is made towards the agent, and a pressure from him), a person who thus learns the notion of attraction may, without absolutely attributing consciousness to the sun, obtain a rather mysterious notion of attraction from something remaining of the original sense of the word pull or pressure. This it is of course desirable that he should get rid of: but if, from failing to do so, he should be inclined to doubt of what is called attraction, he would do well to remember that by the same rule he should deny that a weight placed in the scale of a balance presses against the scale, or that a weight hung to a beam pulls the beam.

Having said thus much, nothing remains as to the manner of estimating pressures, except to give a reference to the articles FORCE, MASS, MOMENTUM, MOTION (LAWS OF), &c.

We thence collect that in problems of dynamics it is requisite to estimate pressure (in cases in which it cannot be balanced against a weight) by the velocity which it would produce or destroy in a given mass of matter, and in a given time: it being known that the weight of a mass means that pressure which, applied to the mass, would produce in one second 32·19 feet of velocity. An instance of this process occurs in CENTRIPETAL AND CENTRIFUGAL FORCES.

Pressure can only produce an effect in *time;* an instantaneous alteration of velocity (as noted in IMPULSE) being mechanically absurd. But if a pressure produce its whole effect in an imperceptible time, there is all the appearance of an instantaneous destruction or creation of velocity. Suppose a hammer, for instance, to strike an anvil with a velocity of 20 feet in a second. The instant the contact begins both hammer and anvil begin to be compressed, and the compression begins at the rate of 20 feet a second. But the resistance to compression is enormous, and is a pressure which, though it takes time to destroy any velocity, yet will destroy a velocity of 20 feet a second in a very small fraction of a second. The moment the velocity is all destroyed the effort of the anvil and hammer (both of which are compressed) endeavouring to restore themselves, the continuation in fact of the pressure which destroyed the velocity, will give a velocity to the hammer in a contrary direction, or the hammer will rebound, as it is well known to do. In the appendix to Professor Whewell's 'Elementary Treatise on Mechanics' (third or fourth edition), a mathematical investigation of such problems (by Mr. Airy) will be found, upon highly probable hypotheses as to the constitution of matter. The following result of these hypotheses (which cannot be far wrong) will give an idea of the enormous pressures which are created in common cases of what is called impact. If a column of iron three inches high, be let fall on an anvil two feet high, from a height of eight feet, the compression of both hammer and anvil is about one-thousandth of a foot, and the pressure exerted at the moment when it is greatest is that of a quiescent column of iron similar to the hammer in its action, but of no less than 4000 feet high.

PRESTEIGN. [Radnorshire.]

PRESTER JOÃO, 'the Priest John,' was the name given in the middle ages to a supposed Christian sovereign who was said to live somewhere in the interior of Asia. This report appears to have originated with the Nestorians of Mesopotamia, whose missionaries penetrated into Persia, India, and Tartary, and were protected by some of the sovereigns of those regions. [Nestorians.] Oungh, a powerful khan of the Keraïtes, or Krit Tartars, in the eleventh century ruled over a great part of Eastern Tartary, north of the Chinese wall and near the banks of the river Amour. His residence was at a place called Karakorum. Some of the Mongol khans, and among the rest Temugin, afterwards called Gengis Khan, paid allegiance to Oungh Khan. [Gengis Khan.] A war broke out however between Gengis Khan and Oungh, in which the latter was defeated, with the loss of his life, A.D. 1202. Oungh Khan was reported in Europe to be a Christian, and to have taken priest's orders, and some Nestorian missionaries fabricated and published letters said to have been addressed by him to the pope, Louis VII. of France, the emperor of Constantinople, and to the king of Portugal, in which he is made to style himself John the High-Priest. (Petis de la Croix, *Histoire de Gengis Khan.*)

The first European traveller who mentions Prester John was a Franciscan friar, called John Carpini, who was sent, in 1246, nearly half a century after the death of Oungh Khan, by Pope Innocent IV., on a mission to Batou Khan, the son of Gengis, to induce him to restrain the Mongols from their predatory incursions into Russia, Poland, Hungary, and other Christian countries. Carpini did not meet with the Prester John, but appears to have supposed that he lived somewhere farther to the eastward. Several years after Carpini's journey, another Franciscan monk, called Rubruquis, was sent by Louis IX. of France, who was then in Palestine, A.D. 1253-4, as a missionary to Tartary. The story of Prester John was the cause of the mission. Rubruquis, after great difficulties and privations, reached the camp of Batou Khan in Central Tartary, who forwarded him across the deserts to the court of Mangou, the great khan at Karakorum, where Rubruquis found no Prester John, but he found some Nestorian priests, as well as some Mohammedan imaums, with whom he had several interviews, which however he acknowledges were to little purpose, as the parties could not understand each other.

Rubruquis says that the Nestorians had greatly exaggerated their own influence in Tartary, as well as the power of the late Oungh Khan, who appears however to have tolerated and even encouraged Christian missionaries in his dominions.

Mangou gave Rubruquis a letter for the king of France, and ordered him to be supplied with all necessaries for his return home. On his arrival in Palestine, Rubruquis wrote from his convent at Acre an account in Latin of his adventurous journey, which he addressed to Louis, who had returned to France. This curious narrative is written with much simplicity and greater veracity than that of his predecessor Carpini. It is printed in Purchas's collection of travels, and in Bergeron's 'Voyages faits en Asie, par Benjamin de Tudela, Carpin, Rubruquis, &c.'

The existence of a Christian sovereign in Asia called Prester John, continued to be believed in Europe till the end of the fifteenth century, when the Portuguese, having reached India by the way of the Cape of Good Hope, set about looking for Prester John in that country, but without success, though they found a community of Nestorian Christians on the Coromandel coast. At last Pedro Covilham happened to hear that there was a Christian prince in the country of the Abessines [Abyssinia], not far from the Red Sea, and he concluded that this must be the true Prester John. He accordingly went thither and penetrated to the court of the king of Habbesh, who was then in Shoa. [Abyssinian Christians.] It must be remarked however that the 'negus' or king of Habbesh had never assumed the name of Prester John. (Ludolf, *History of Ethiopia*, b. xi.; Tellez, *Historia Geral de Ethiopia*, b. xi.)

PRESTON, a town in Lancashire, in the hundred of Amounderness, on the northern bank of the Ribble, about 15 miles above its mouth, in 53° 46′ N. lat., 2° 42′ W. long.; 190 miles in a direct line north-north-west of the General Post-office, London; 221 miles by the Birmingham, Grand Junction, and North Union railways (a distance traversed by the day mail in 10½ hours); or 213 miles by the coach-road through St. Alban's, Stony Stratford, Daventry, Coventry, Lichfield, Newcastle-under-Lyme, Knutsford, Warrington, and Wigan.

Preston probably arose out of the decay of Ribchester (probably the Coccium of the Antonine Itinerary), now a village about 10 or 12 miles higher up the Ribble. It was held by Tosti or Tostig, son of Earl Godwin and brother of Harold [Harold II.], and was a borough by prescription; the privileges of the burgesses were extended by a charter of Henry II. without date. There was at an early period an hospital here; and Edmund, earl of Lancaster, son of Henry III., founded an hospital for Grey or Franciscan friars; but from what foundation or at what period the town derived its name (Preston, *i.e.* Priest's town) is not known. The town was partly destroyed by Robert Bruce and the Scots, in one of their incursions into England (A.D. 1322). In the great civil war of Charles I. a severe action was fought near the town on Ribbleton Moor (A.D. 1648), when the Duke of Hamilton, who was bringing an army from Scotland to aid the royalist cause, was routed by Cromwell and Lambert. In A.D. 1715, the Jacobite insurgents from Northumberland, under Forster [Northumberland], took possession of the town; but after a brave resistance were obliged to surrender to the royalist forces. In the subsequent insurrection of 1745-46, the Jacobites passed through the town in their retreat: they attempted to entrench themselves here, but withdrew on the approach of the Duke of Cumberland.

The town is on an eminence rising from the north bank of the river, and consists of a number of streets irregularly laid out, but tolerably well lighted and paved. Half a century ago Preston was considered the genteelest town in Lancashire, a distinction which it owed to the number of good families resident in the neighbourhood, to its being the seat of the law courts of the duchy of Lancaster, and to its comparative freedom from the bustle of trade and manufacture. It was then a handsome well-built town, with many good houses. Since then its character has materially changed; it has become the seat of a considerable cotton manufacture; and factories, some of them on a very large scale, and houses are continually in course of erection. Nearly three-fourths of the houses are rated at 5*l.* or less: they are however generally neatly and substantially built of brick; and many are handsome and of large size. Near the town are several handsome villas. The town is supplied with water by an incorporated company. There are several pleasant walks in the neighbourhood, and a waste called 'the moor' adjacent to the town, containing 240 acres, over which the burgesses possessed the right of common, has been lately enclosed and laid out in public walks for the recreation of the inhabitants. There are two bridges over the Ribble: Walton bridge, on the road to Chorley, Wigan, and London, a neat bridge of three arches, built A.D. 1782; and Penwortham bridge, on the road to Liverpool, a bridge of five arches, built in the middle of the last century. The parish church was formerly dedicated to St. Wilfred; but the structure has been rebuilt, and dedicated to St. John. It has a square embattled tower, erected A.D. 1814, with clustered pinnacles. It will hold 1500 persons. St. George's church, built above a century ago, is a brick building, capable of containg 1000 persons. The church of the Holy Trinity capable of containing 1250 persons, was built A.D. 1814. St. Paul's in Park-street, and St. Peter's in the Fylde-road, are both Gothic churches, erected within the last few years by grants from the Parliamentary Commissioners: they are capable of accommodating 1250 and 1450 persons respectively. There are several dissenting places of worship; and at least two Roman Catholic chapels, one of them a very elegant building. There are a custom-house, a town-hall (a neat building of brick), a county sessions-house and house of correction, a modern and convenient building used as a gaol and debtors' prison for the borough; a commodious lock-up house, a neat theatre, a handsome suite of assembly rooms, warm and cold baths, a building for the dispensary, and a house of recovery from fever.

The parish of Preston comprehended in 1831 an area of 14,230 acres and a population of 36,336. It was subdivided into nine chapelries or townships: the borough and township of Preston contained 1960 acres, and a population of 33,112. By the Boundary Act the township of Fishwick (area 600 acres, 759 inhabitants) was added to the borough for parliamentary purposes, and by the Corporation Reform Act for municipal purposes also, making the present area of the borough 2560 acres; the population 33,871. Subsequent increase is supposed to have raised the population to about 40,000. The number of houses in 1831 was 6722, viz. 6299 inhabited, 342 uninhabited, and 81 building; the number of families was 6749, only 130 of which were engaged in agriculture. The staple trade of Preston, till within the last half century, was in linens, for which it was a considerable mart, and some of which were manufactured here. Toward the close of the last century the cotton-manufacture was introduced, and is now the staple of the place, giving employment to 3000 men, besides a greater number of women and boys. There are several iron-founderies, chiefly for making the machinery used in the cotton-manufacture. Some leather is made, and there is a small fishery on the Ribble. The Ribble is navigable at spring-tides for vessels of 150 tons: but it is ill adapted for trade: the shipping which frequent it are all coasters. About 30,000 to 40,000 tons of shipping enter the river or clear out yearly. Coal is brought to the town by the navigation of the river Douglas, which flows into the Ribble just above its mouth. The North Union railroad, and the Manchester and Liverpool railroad, connect Preston with those two great towns, and the Grand Junction and London and Birmingham railroads extend the same means of communication to the midland districts and the metropolis. The Preston and Wyre railroad, now nearly finished, connects Preston with the new harbour of Fleetwood at the mouth of the Wyre. Another railroad, in the course of execution, runs from Preston to Lancaster, another from Preston to Longridge on the Ribble, and a third, branching from the North Union, connects Preston with Chorley, Bolton, and Manchester. The Lancaster canal, which runs from Lancaster to Chorley, where it joins the Leeds and Liverpool canal, passes on the west side of the town, which it connects with the great canal system of the manufacturing districts. There are three weekly markets held in a spacious and well-paved market-place in the centre of the town: the Saturday market is by far the largest of the three, and is principally for corn. There are several yearly fairs; one of these, held early in January, is a great horse-fair.

The borough has been divided, under the Municipal Reform Act, into six wards; it has twelve aldermen and thirty-six councillors. The jurisdiction of the borough magistrates is not exclusive, but the county magistrates do not in fact interfere. Quarter-sessions are held before the mayor, aldermen, and recorder. There is a Court of Record for all personal actions to any amount. Petty-sessions are held nearly every day. A public festival, called a Guild Merchant, is held by the corporation every twenty years; it is commemorated on the first day by a procession of the members of the corporation and of the different trades in characteristic dresses, with bands of music; and by a procession of the ladies of the town and neighbourhood, preceded by girls employed in the cotton-factory, on the next day. Both processions attend the church. The cost of this pageant is usually very considerable. Preston sent members to parliament in the reigns of Edward I. and II., after which the privilege was lost or neglected till the time of Edward VI. The number of voters on the register, in 1835-6, was 4204. Preston is one of the polling-stations for the northern division of the county.

The living of Preston is a vicarage in the archdeaconry of Richmond and diocese of Chester, of the clear yearly value of 665*l.* The perpetual curacies are of the following clear yearly value:—St. George, 161*l.*; St. Paul, 95*l.*; St. Peter, 110*l.*; Trinity, 126*l.* The curate of St. Peter has a glebe-house.

The township of Preston contained, in 1833, an infant-school with 135 children; twenty-seven dame-schools, with 515 children; an endowed grammar-school with 52 boys; another endowed school (the Blue-Coat school), with 25 boys and 25 girls; five subscription charity-schools, with 765 boys and 585 girls; thirty boarding or day schools, with 1318 children of both sexes; and seventeen Sunday-schools, with 2226 boys and 2421 girls. Most of these Sunday-schools have lending-libraries attached. There was no school in Fishwick township. In the other parts of the parish there were two endowed day-schools, with 162 children (118 boys and 44 girls); two other day-schools, with 49 children (23 boys and 26 girls); and five Sunday-schools, with about 280 children. (Aikin's *Environs of Manchester*; *Beauties of England and Wales.*)

PRESTON-PANS, a town and parish in Haddingtonshire in Scotland. The parish extends about two miles along the shore of the Frith of Forth, and about a mile inland. The town of Preston-pans is on the shore of the Frith, about eight miles in a direct line east of Edinburgh. It is divided into two parts by a rivulet flowing into the sea: the western part is called the Cuthill or Kuittle. It is a straggling dingy town, chiefly consisting of a single street parallel with the Frith, and studded here and there with salt or other manufactories, which keep the place almost continually enveloped in smoke. (Chambers's *Gazetteer of Scotland.*) There is a small harbour about half a mile west of the town, called Morrison's haven. The manufacture of salt (from which the town obtained the termination of its name, 'pans') is still carried on: there are a soap-house, a brewery, and one or two potteries. A considerable fishery is carried on, and there are coal-pits near the town. Preston-pans is a burgh of barony. The parish, in 1831, had 426 houses, inhabited by 514 families: the total population was 2322, of which about three-fourths were in the town.

The ruins of Dolphingston Castle, once a place of some note, are in the parish.

Preston-pans was the scene of the first pitched battle between the royal forces and the insurgent Highlanders in the rebellion of 1745. On the 20th of September, Sir John Cope, with the royalist troops, amounting to 2100 men, infantry and dragoons, marched from Haddington towards Edinburgh, and encamped near the town of Preston-pans. Here he was surprised on the morning of the 21st by the insurgents. The troops had scarcely time to form in order of battle, when they were charged by the Highlanders: the line was broken by their impetuous onset; the cavalry were soon put to flight, and the infantry, with the exception of about 170 men, were either killed or captured. Colonel Gardner, who commanded a regiment of dragoons, fell in the engagement, gallantly fighting after his regiment had been put to flight. The artillery, tents, baggage, and military chest were all taken by the insurgents, who lost only about 100 men, killed and wounded. This victory was followed by the almost entire occupation of Scotland by the insurgents and the invasion of England by them. It forms a striking incident in Sir Walter Scott's novel of 'Waverley.'

PRESUMPTION. A presumption is variously defined. The following is a definition:—'A presumption may be defined to be a belief as to the existence of a fact not actually known, arising from its necessary or usual connection with others which are known.' (Starkie, *Law of Evidence*, i. 23.) In another passage (p. 1234) the same definition is given in substance, with the word 'inference' substituted for 'belief.'

A fact may be proved by the immediate knowledge of the witnesses to it, which is called direct evidence. If it cannot be so proved, some other fact may generally be proved by direct evidence, from which the fact in question may often be inferred. If such other fact can be proved, and the existence of the fact in question can be inferred, such inference is a presumption. The inference may be either strictly logical or necessary, or it may be only probable, that is, the fact inferred may be true or it may not be true. If we cannot infer from the fact proved that the fact in question may be true, there can be no presumption at all as to such last fact. In all cases then, in order to establish a presumption, there must necessarily be an inference from a fact or facts; but the inference may be either necessary or probable. If necessary, it cannot, by the supposition, be disproved; if probable, it may either be disproved by evidence, or it may not be possible to disprove it for want of evidence, and yet the inference will still only be probable.

Presumptions which are necessary can hardly ever be considered as not conclusive in any system of law. Presumptions which are only probable may by positive law be made as conclusive as necessary presumptions, that is, it may not be permitted to disprove them when they could be disproved; or where such disproving evidence is wanted, and yet the inference is only probable, positive law may give it the same conclusive force as a necessary presumption.

A presumption, when established, that is, a fact when presumed, is legally the same as a fact proved in such manner as the particular system of law requires such fact to be proved. If then the law annexes any legal consequence to a given fact when proved, it annexes the same to it when the fact is legally presumed. It is only by virtue of legal consequences being annexed to facts that they become objects of jurisprudence. The establishment then of a presumption, in a legal sense, is only the establishment of a fact to which certain legal consequences are annexed.

In our own system, the presumption is sometimes made by a judge or a number of judges, and sometimes by a jury, but the consequences are the same. Some writers say that presumptions are either 'legal and artificial' or 'natural.' They divide 'artificial or legal presumptions' into two kinds, immediate and mediate. 'Immediate are those which are made by the law itself directly and without the aid of a jury. Mediate presumptions are those which cannot be made but by the aid of a jury.' 'Presumptions may therefore be divided into three classes: 1, Legal presumptions made by the law itself, or presumptions of mere law; 2, Legal presumptions to be made by a jury, or presumptions of law and fact; 3, Mere natural presumptions, or presumptions of mere fact.' (Starkie, p. 1241.)

The first class of presumptions, it is said, are either absolute and conclusive, or they may be rebutted by evidence to the contrary. The presumption of law that a bond was executed upon a good consideration cannot be rebutted by evidence, so long as the bond is unimpeached, that is, so long as it is admitted to be a bond. But though the law presumes that a bill of exchange was accepted on good consideration, it admits evidence to show that such was not the fact. Now this presumption of mere law is nothing more than a fact presumed by a judge or judges, to which fact so presumed, that is, so taken to be true, certain legal consequences are annexed or belong. It is however a very inaccurate expression to speak of a presumption of mere law; for, as the same writer says (p. 1242), 'when the law presumes or infers any fact to which a legal consequence is annexed from any defined predicament of facts, the law in effect indirectly annexes to that predicament the legal consequence which belongs to the presumed fact.'

One presumption of mere law may be opposed by another, and the law, that is, the court, must then decide which is the stronger.

Presumptions of *mere law*, as shown, are such as are made by the court. There are instances of presumptions made by act of parliament, that is, the legislature has declared that a certain fact or facts, when proved, shall be conclusive proof of another unproved fact which is not a necessary, and, it may be, is often not a highly probable inference from the proved fact. A statute of 21 James I., c. 27 (now repealed), made proof of the concealment of the death of a bastard child by the mother conclusive evidence of her having murdered it, unless she could prove that it was born dead. Sometimes an act of parliament declares that a certain presumption shall not be allowed or made. (2 and 3 Wm. IV., c. 71, s. 6.) A presumption of mere law is sometimes called an *intendment* of law.

Presumptions of *law* and *fact* are 'also artificial presumptions which are recognised and warranted by the law as the proper inferences to be made by juries under particular circumstances.' (Starkie, p. 1243.) In other words, these are facts which the law, that is, the court, will allow a jury to presume from other facts proved by direct evidence. When the presumed fact is declared by the jury to be a real fact, or is implicitly contained in their verdict, the legal effect is the same as if it were presumed by the judge. Indeed it is said 'that the inference (made by the jury) is never conclusive,' which appears to mean that there are presumptions which are not necessary, and sometimes may not be highly probable, but they are still such as a jury may make (at least under the direction and advice of the court), and their verdict will be good. 'Thus a jury is required, or at least advised by a court to infer a grant of an incorporeal hereditament after an adverse enjoyment for the space of twenty years unanswered.' (Starkie, p. 1244.) On this subject it is said in another passage (p. 1214), 'the presumption of right in such cases is not conclusive; in other words, it is not an inference of *mere law* to be made by the courts, yet it is an inference which the courts advise juries to make whenever the presumption stands unrebutted by contrary evidence. Such evidence in theory is mere presumptive evidence; in practice and effect it is a bar.'

The third class contains 'the natural presumptions of *mere fact*.' 'They are wholly independent of any artificial legal relations and connections, and differ from presumptions of mere law in this essential respect, that those depend upon or rather are a branch of the particular system of jurisprudence to which they belong; but mere natural presumptions are derived wholly by means of the common experience of mankind from the course of nature and the ordinary habits of society.' (Starkie, p. 1245.) This class of presumptions properly belongs to a jury, and yet the courts will sometimes make presumptions of this kind without the aid of a jury. These presumptions then are such as a jury may make without the advice or direction of the court, and 'it seems to be a general rule that whenever there is evidence on which a jury have founded a presumption according to the justice of the case, the courts will not grant a new trial.' (Starkie, p. 1247.)

Though this division of presumptions is far from being characterised by precision, it cannot be denied that it is a kind of index to the practice of the courts as to presumptions. The division is founded—first, on the fact that certain presumptions, which are by no means necessary consequences from the facts proved, are admitted by the judges either as conclusive, or as valid, till they are disproved; these presumptions are sometimes made by the court, but when it is necessary, the court will permit or advise the jury to make them, in order to arrive at a conclusion as to the fact in question: and second, it is founded on the different functions of the judge and the jury, the former declaring the law, and the latter finding the facts, when their assistance for that purpose is necessary.

These presumptions of *mere law*, whether made by the court or by the jury under its direction, are really artificial rules of proof which have been established by judicial decisions, or which in any new case the court upon due consideration will make, and if necessary will direct the jury accordingly.

In those courts where there is no jury, one ground of the classification made by Starkie does not exist, and the judge makes his presumptions either in conformity to the technical rules of his court in cases to which they apply, or he makes his presumptions in cases where there are no technical rules, just as a jury does or any indifferent persons do upon facts submitted to them for their consideration.

Presumption then is either a positive rule by which a certain conclusion is declared by statute, or by the judges, or by the jury under the direction and advice of the judges, to follow from certain other proved facts; or it is a conclusion from certain other proved facts which a judge or a jury may make if they find the probative force of the proved facts sufficient to induce them to make the inference called by Starkie a natural presumption, or presumption of mere fact. Presumptions therefore are incident to every head of law in which proof is required; and the presumptions which are positive rules of law are part of the law of the things to which they relate.

The term 'præsumptio' occurs occasionally in the 'Digest,' and in the sense of an inference from a fact proved or admitted. (*Dig.*, 22, tit. 3, s. 25.)

(Bentham, *Rationale of Judicial Evidence;* Starkie, *On Evidence;* Phillips, *On Evidence.*)

PRESUMPTIVE HEIR. [Descent.]

PRE'VESA, a town in European Turkey, on the north side of the entrance of the Gulf of Arta, in 38° 57′ N. lat. and 20° 49′ E long. The origin of Prevesa is not known; it is about three miles distant from the ruins of the antient Nicopolis founded by Augustus Cæsar in commemoration of his naval victory of Actium. Its situation, and perhaps its commercial prosperity, made it an object of desire to the Venetians, who obtained possession of it in 1684, and it was subsequently confirmed to them by the treaty of Passarovitz. It appears to have been a dependency of the Seven Islands, and in 1798 came with them into the hands of the French by virtue of the treaty of Campo Formio. War having broken out between France and the Porte, Ali Pacha of Albania sent 5000 men, under his son Mouctar, to attack Prevesa. The French garrison (less than 1000 strong) and the townsmen marched out to encounter the assailants, but were entirely defeated by the Albanians, who took and plundered Prevesa, the population of which is said at this time to have amounted to 10,000 or 12,000. The oppressive government of Ali quickly reduced the population and annihilated the previously flourishing commerce of the town. The streets were deserted, most of the houses, and all the churches except one, were destroyed. Ali made Prevesa his chief naval station, fortified the town with new works, and adorned it by the finest palace or seraglio in his dominions, built at the entrance of the bay. Some new and handsome houses were built by the Turks and Albanians who settled here, but Prevesa has never recovered its prosperity under the Turkish yoke. In 1825 the town suffered much from an earthquake.

Prevesa has probably a population of from 3000 to 4000, and may still be regarded as the principal outlet of the trade of the Gulf of Arta. The chief articles of export are grain, especially wheat and maize, timber, oil, tobacco, cotton, and wool; capotes, or Albanian cloaks, are also important articles of trade. The corn is chiefly sent to the Ionian Islands, to Malta, and to various parts of Italy. The timber is the growth of the forests on the southern shores of the gulf. It is sent chiefly to Malta, for building and firewood. The cotton and cotton-yarn are chiefly from Thessaly. The imports are coffee, sugar, common cloth, velvet, iron goods, fire-arms, &c. (Holland's and Hughes's *Travels in Albania*, &c.)

PRICE. [VALUE; WAGES.]

PRICE, RICHARD, was born at Tynton in Glamorganshire, February 23, 1723. His father Rice Price, of whose second marriage Richard was the sole offspring, was a rigid Calvinistic minister, remarkable for his intolerance, who spared no pains to imbue his son with sound Calvinistic doctrine. Richard however began early to claim the privilege of free opinion, and by his scruples often incurred the anger of his parent. The latter died in 1739, and by his will the bulk of the property, which appears to have been considerable, came into the possession of one son, the widow and six other children being left in straitened circumstances to provide for their own maintenance. The widow and the eldest son survived this event only a few months, and shortly after Richard, then in his eighteenth year, resolved on proceeding to London in the hope of qualifying himself for the clerical profession. The heir of his father's fortune provided him with both horse and servant as far as Cardiff, but left him without the means of performing the rest of the journey except on foot or in a waggon. His education during his father's lifetime had been superintended by several dissenting clergymen, and on reaching the metropolis, through the interest of a paternal uncle, he obtained admission to a dissenting academy, where he pursued his studies in mathematics, philosophy, and theology. In 1743 he engaged himself as chaplain and companion to the family of Mr. Streathfield of Stoke Newington. Here he continued to reside during the ensuing thirteen years, at the end of which the engagement terminated by the death of Mr. Streathfield, who left him some small property. About the same time his circumstances were further improved by the death of his uncle, and by his receiving the appointment of morning preacher at Newington Green Chapel. He married in 1757. The year following he published his 'Review of the principal Questions and Difficulties in Morals,' 8vo., Lond., 1758 and 1787, a work which, though designated by Brown as 'very elaborate, very tedious, but not very clear,' seems to have established his reputation as a metaphysician and moralist. In 1767 he was applied to by a committee of gentlemen connected with the legal profession for his opinion of a plan which they contemplated adopting in order to secure an annuity to their surviving widows. This drew his attention to the defective character of the principles upon which many similar societies had been already instituted, and induced him to write his 'Treatise on Reversionary Payments,' 8vo., Lond., 1769, the publication of which was the almost immediate cause of the dissolution of several of those societies, and the beneficial modification of others. It has since passed through five editions, the last is that edited by Mr. Wm. Morgan, in 2 vols. 8vo., Lond., 1803.

In 1776 appeared his 'Observations on Civil Liberty and the Justice and Policy of the War with America.' So highly was this work appreciated by the advocates of American independence, that an application was made to the author to permit the publication of a cheap edition, which he readily conceded, and thus, observes Mr. Morgan, 'sacrificed all private emolument to the support of a cause from which he could not possibly derive any other benefit than the consciousness of having endeavoured to deserve well of mankind.' In a few months nearly 60,000 copies are said to have been disposed of, and among the many congratulatory addresses which he received on the occasion, the corporation of London testified their 'approbation of his principles and the high sense they entertained of the excellence of his observations on the justice and policy of the war with America' by presenting him with a gold box enclosing the freedom of the city. Two years later (1778) the American Congress, through their commissioners, Dr. Franklin and others, communicated to him their desire to consider him a citizen of the United States, and to receive his assistance in regulating their finances, assuring him that, in the event of his deeming it expedient to remove with his family to America for that purpose, a liberal provision should be made for requiting his services. This invitation was declined, on the ground of his being ill qualified to render the assistance sought, his connections with this country, and his fast advancement into the evening of life; adding, that he looked to the United States as being then the hope and likely soon to become the refuge of mankind.

Dr. Price died in London in 1791, surviving but few years his wife and several of his most eminent and intimate friends, among whom were Dr. Adams, master of Pembroke College, Oxford, Mr. Howard, the philanthropist, and Dr. Franklin. During the latter part of his life he suffered severely from an affection of the bladder. The honorary degree of Doctor of Divinity was conferred upon him in 1769 by the University of Glasgow, solely through the instrumentality of his friends, and apparently without their intentions having been previously made known to him. He was a firm believer in the immateriality of the soul, and considered that the Scriptures authorised the opinion that there is no state of action or perception between death and the eternal judgment. Drs. Priestley and Price, notwithstanding their frequent controversies, were always on terms of the closest friendship. Speaking of the latter, Dr. Priestley remarks—'Perhaps the sentiments of no man's mind were ever more clearly perceived in the natural expression of them than those of Dr. Price. . . Such simplicity of manners, with such genuine marks of perfect integrity and benevolence, diffused around him a charm which the forms of politeness can but poorly imitate.'* His disinterestedness was conspicuous in all his dealings, and, as a rule, he expended one-fifth of his income on charitable objects. For further information the reader is referred to the 'Memoirs of the Life of Richard Price, D.D., by William Morgan, F.R.S.,' London, 1815, 8vo., from which this notice has been principally drawn.

The works of Dr. Price not already referred to are:—1, 'Four Dissertations on Providence, Prayer, the state of Virtuous Men after Death, and Christianity,' 8vo., 1766, 1768; 2, 'The Nature and Dignity of the Human Soul,' 8vo., 1766; 3, 'An Appeal to the Public on the subject of the National Debt,' 8vo., 1772, 1774; 4, 'An Essay on the Present State of the Population in England and Wales, with Morgan on Annuities,' 8vo., 1779; 5, 'The Vanity, Misery, and Infamy of Knowledge without suitable Practice,' 8vo., 177 ; 6, 'An Essay on the Population of England from the Revolution to the present time,' 8vo., 1780; 7, 'The State of the Public Debts and Finances at signing the Preliminary Articles of Peace in January, 1783,' 8vo., 1783; 8, Postscript to same, 8vo., 1784; 9, 'Observations on the Importance of the American Revolution and the Means of making it useful to the World,' 8vo., 1784; 10, 'A Discourse on the Love of our Country,' 8vo., 1789, 1790; 11, 'Britain's Happiness and its full Possession of Civil and Religious Liberty briefly stated and proved,' 8vo., 1791; 12, Sermons, viz. 'Fast Sermons,' 1759, 1779, 1781, &c.; 'Sermons on Various Subjects,' 8vo., 1786, 1816; 'Sermons on the Christian Doctrine,' 8vo., 1787; 13, 'On the Expectations of Lives, the increase of Mankind, the influence of great towns on Population, and particularly of the state of London, with respect to healthfulness and number of inhabitants,' Phil. Trans., 1769; 14, 'On the Insalubrity of Marshy Situations,' Ib., 1774; 15, 'On the Difference between the Duration of Human Life in Town and in Country Parishes and Villages,' Ib., 1775; 16, 'Short and Easy Theorems for finding in all cases the difference between the values of Annuities payable yearly, half-yearly, quarterly, and monthly,' Ib., 1776; 17, 'On the Proper Method of calculating the Value of Reversions depending on Survivorship,' Ib., 1790; 18, 'On the Effect of the Aberration of Light on the Time of the Transit of Venus over the Sun's Disk,' Ib., 1790. The 'Transactions' of the year 1763 contain an essay on the solution of a problem in the theory of probabilities, which, though not entirely the work of Dr. Price, requires to be noticed under the present article. The problem was: 'Given the number of times an unknown event has happened and failed; required the chance that the probability of its happening in a single trial lies somewhere between any two degrees of probability that can be named,' and belongs to that division of the theory termed 'inverse probabilities,' the more important of the two, and which may be said to have originated with this problem, since it was the first of the kind that was answered, and, notwithstanding its practical utility, no successful attempt had been previously made to answer it. Dr. Price found a solution in an unfinished state among the MSS. of the then late Rev. Mr. Bayes, F.R.S., and his chief merit consisted in immediately appreciating its importance, and directing his mind to its improvement and extension. A supplement to the solution was inserted by Dr. Price in the 'Transactions' of the following year, shortly after which he was elected a member of the Society.[*]

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* 'Sermon preached at Hackney by Dr. Priestley on the occasion of the death of Dr. Price,' p. 20.

PRIDEAUX, JOHN, an English bishop, was born at Stowford, near Ivybridge in Devonshire, September 17th, 1578. His father, being in humble circumstances, and having a large family, could give him only a common education. While yet in his boyhood he was a candidate for the office of parish-clerk at Ugborow, a neighbouring village, but he did not succeed, and to this failure he used to attribute his elevated position in after-life. He was then noticed by a lady of the parish, who maintained him at school till he had acquired a knowledge of Latin, and he then went to Oxford, and was admitted a poor scholar at Exeter College, in 1596: he was elected probationer fellow of his college in 1602, being then B.A. In the following year he received holy orders, and having become noted for his profound knowledge of divinity, as well as his great learning in general, he was elected rector of his college upon the death of Dr. Thomas Holland in 1612. In 1615 he succeeded Dr. Robert Abbot, then promoted to the see of Salisbury, as Regius Professor of Divinity, canon of Christ Church, and rector of Ewelme. He afterwards held the office of vice chancellor for several years. 'In the rectorship of his college,' says Wood, 'he carried himself so winning and pleasing by his gentle government and fatherly instruction, that it flourished more than any house in the university with scholars, as well of great as of mean birth; as also with many foreigners that came purposely to sit at his feet to gain instruction.' He no less distinguished himself in the divinity chair, which he occupied twenty-six years. In 1641, he was consecrated bishop of Worcester, but on account of his adherence to the king he found his dignity neither pleasant nor profitable. He became so impoverished as to be compelled to sell his books, and so was, as Dr. Gauden says, *Verus librorum helluo*. 'Having,' continues Wood, 'first by indefatigable studies digested his excellent library into his mind, he was after forced again to devour all his books with his teeth, turning them by a miraculous faith and patience into bread for himself and his children, to whom he left no legacy but pious poverty, God's blessing, and a father's prayers.' He died of a fever, at Bredon in Worcester, July 12, 1650.

The works of Bishop Prideaux were numerous, and mostly written in Latin, upon grammar, logic, theology, and other subjects. Wood describes him as 'a plentiful fountain of all sorts of learning, an excellent linguist, a person of a prodigious memory, and so profound a divine, that he was called 'Columna fidei orthodoxæ, ingens scholæ et academiæ oraculum,' &c. Though he died before the publication of the London Polyglott, he was well known to the editor Brian Walton, who appeals to his authority on the nicer points of Hebrew criticism, in vindicating the Polyglott from certain cavils that had been raised against it. Bishop Prideaux had a son named Matthias, who was born in 1622, and died of the small-pox in 1646. He was a fellow of Exeter College. After his death, in 1648, was published, in small 4to., a work of his entitled 'An easy and compendious Introduction for reading all sorts of Histories,' with a 'Synopsis of Councils,' added by his father. This book was several times reprinted, but it would now probably be thought more curious than useful, though it might furnish some valuable hints to persons engaged in teaching. (Wood's *Athenæ Oxonienses;* Todd's *Life of Brian Walton;* Chalmers's *Biographical Dictionary*.)

PRIDEAUX, HUMPHREY, was born at Padstow in Cornwall, May 3, 1648, of an antient and honourable family well known in that county. He was sent to school first to Liskeard, then to Bodmin, and was removed thence to Westminster, to be placed under Dr. Busby. Here he was soon chosen king's scholar, and after three years he was elected to Christ Church, Oxford, where he became a student in 1668. He commenced B.A. in 1672, and shortly after, under the direction of Dr. Fell, he published an edition of the historian Lucius Florus. He took his degree of M.A. in 1676, and in the same year he published, by appointment of the University, the inscriptions of the Arundel Marbles with a comment, in one vol. folio, under the title of 'Marmora Oxoniensia ex Arundellianis, Seldenianis, aliisque conflata, cum perpetuo Commentario,' of which a corrected edition was published in 1732 by Michael Maittaire. In 1679 Prideaux was presented by lord-chancellor Finch to the rectory of St. Clement's, Oxford, and in the same year, being appointed Dr. Busby's Hebrew lecturer at Christ Church, he published two tracts of Maimonides with a Latin translation and notes. In 1681 he was installed prebendary of Norwich, and in the following year was made B.D., and shortly afterwards was instituted to the rectory of Bladen with Woodstock, in Oxfordshire. He proceeded D.D. in 1686, and having exchanged his living of Bladen for that of Saham in Norfolk, he went to settle upon his prebend in Norwich. Here he became engaged in some severe contests with the Roman Catholics, the result of which was the publication of his work 'The Validity of the Orders of the Church of England made out.' He also took an active part in resisting the arbitrary proceedings of James II. which affected the interests of the Established Church. In 1688 he was collated to the archdeaconry of Suffolk, and, not without due consideration, he took the oaths of allegiance to William and Mary, and acted up to them faithfully, but he always looked upon the non-jurors as honest men, and treated them with kindness and respect. The next four or five years he spent at the parsonage of Saham, and exerted himself to the utmost in discharging his parochial and archidiaconal duties. While the sees of the non-juring bishops were filling up, without the knowledge or desire of Dr. Prideaux, the bishops of London and St. Asaph earnestly recommended him for the diocese of Norwich, but the recommendation did not succeed, and Dr. Moor was appointed. Upon the death of Dr. Pocock in 1691, the professorship of Hebrew at Oxford was offered to Dr. Prideaux, who declined it. In 1694 he resigned his living at Saham, and in 1696 he was instituted to the vicarage of Trowse near Norwich. He published in 1697 his 'Life of Mahomet,' of which three editions were sold off the first year. In 1702 Dr. Prideaux was made dean of Norwich in the room of Dr. Henry Fairfax. On the translation of Dr. Moor from Norwich to Ely, in 1707, Prideaux was advised and encouraged to apply for the vacant see, but he was not at all disposed to seek for such advancement. This year he published 'Directions to Churchwardens,' a work which has often been reprinted. The best edition is that corrected and improved by Mr. Tyrwhitt, Lond., 1833. In 1710 appeared Dr. Prideaux's work upon 'Tythes,' 1 vol. 8vo., which he had projected in 4 vols., but his plan was defeated by 'the calamitous distemper of the stone,' to use his own language; and this year he resigned the vicarage of Trowse. His disease was the occasion of much suffering and loss of time, and it entirely disabled him from public duties. But he still pursued his private studies, and at length, in 1715, he brought out the first part of his principal work, the 'Connection of the History of the Old and New Testament, and the second part in 1717, folio. This has been one of the most widely circulated books in the English language, and it has still a peculiar value among several more recent works of a similar design. It was the last work that he published. His strength had been long declining, and he died November 1, 1724, in his 77th year, and was buried in Norwich cathedral. About three years before his death he presented his collection of Oriental books, more than 300 in number, to the library of Clare Hall, Cambridge. Several posthumous tracts and letters, with a 'Life of Dr. Prideaux,' the author of which is not named, were published in 1748 8vo. Dr. Prideaux was a man of varied and solid learning and of great moral worth and ardent piety.

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[*] It was in the above paper that the important theorem was first announced, viz., that the propability in favour of an hypothesis is proportional to the probability which that hypothesis gives to observed events (Lacroix, *Traité des Prob.*, p. 149, third edit.); but as Mr. Lubbock, in his 'Essay on Probability,' published in the 'Library of Useful Knowledge,' observes, either Bayes or Price appears to have confounded the chance of the probability of the event's happening being comprised within the proposed limits, with the probability itself.

(Wood's *Athenæ Oxonienses; Life*, as above; *Letters by eminent Persons.*)

PRIEST (Saxon, *preoster;* French, *prêtre* (prestre); Dutch, *priester;* Spanish, *presbytero,* all remotely from the Greek *πρεσβύτερος, an elder*, and immediately from the Latin *presbyter*), in its popular acceptation, is the name of a minister of religion in all ages and countries.

Priest is used to express the Greek *hiereus* (ἱερεύς) and the Latin *sacerdos*, which signify in general a sacrificer. Whatever may be the primitive meaning of the Hebrew כֹּהֵן (*cohen*), it is rendered in the Septuagint by ἱερεύς, and its usage plainly shows that it denotes a sacrificer. An elder, זָקֵן (*zaken*), has πρεσβύτερος as its corresponding word. In Wiclif's New Testament, which is a translation from the Vulgate, priest, answering to the Latin presbyter, several times occurs, where the Authorised Version has elder; e.g. *Acts*, xiv. 23, 'And whanne thei hadden ordeyned prestis to hem bi alle citees;' c. xv. 2, 'The apostlis and preestis,' which, in v. 4 is 'The apostlis and the eldre men;' *James*, v. 14, 'Prestis of the chirche.'

Priest, in the formularies of the Church of England, is used in its original sense of presbyter, and points out the second degree of the ministers, to be admitted to which a man must be, according to the 34th canon, of the age of 'four and twenty years complete.'

The existence of an official person to act in some way between the Deity and man appears among the earliest notices of history, whether sacred or profane. In the *Book of Genesis*, Melchizedek is named 'Priest of the most high God.' Among the Jews an order of men existed who were especially appointed by God to minister in holy things, and whose qualifications and functions are set forth at large in the writings of Moses. The Egyptians had great numbers of priests, and they had lands in the time of Joseph. (*Gen.*, xlvii. 22.) In the first ages of the Greeks, the same person was mostly their priest and king. In the course of time the office of priest became distinct, and sometimes women, as well as men, were appointed to this office. It is probable however that the most antient priesthood among all nations was that which fathers or heads of families exercised over their own dependents; and thus it will appear that kingly government and sacerdotal authority of some kind or other would naturally spring from the paternal relation. (Shuckford's *Connection of Sacred and Profane History.*)

PRIESTLEY, JOSEPH, the son of Jonas Priestley, a cloth-dresser at Birstal-Fieldhead, near Leeds, was born at Fieldhead, March 13, 1733, old style. His mother dying when he was six years of age, he was adopted by a paternal aunt, Mrs. Keighley, by whom he was sent to a free grammar-school in the neighbourhood, where he was taught the Latin language and the elements of the Greek. His vacations were devoted to the study of Hebrew under a dissenting minister; and when he had acquired some proficiency in this language, he commenced and made considerable progress in the Chaldee, Syriac, and Arabic; but whether with or without the assistance of a tutor does not appear. In the mathematics he received some instruction from Mr. Haggerstone, who had been educated under Maclaurin. From his habits of application and attachment to theological inquiries, his aunt early entertained hopes of his becoming a minister. Ill health however, which in many cases induces a preference of a studious to a more active life, led him to abandon for awhile his classical studies, and apply himself to mercantile pursuits. We learn from his own statement that his constitution, always far from robust, had been injured by a 'consumptive tendency, or rather an ulcer in the lungs, the consequence of improper conduct when at school, being often violently heated with exercise, and as often imprudently chilled by bathing, &c.' Without the aid of a master, he acquired some knowledge of the French, Italian, and German. With the return of health his earlier occupations were resumed, and at the age of nineteen (1752), he entered the dissenting academy at Daventry (now 'Coward College,' London), conducted by Mr. (afterwards Dr.) Ashworth, the successor of Dr. Doddridge. His parents were both of the Calvinistic persuasion, as was also his aunt, who had omitted no opportunity of inculcating the importance of the Calvinistic doctrine. As however differences of opinion on doctrinal points were not with her sufficient ground for rejecting the society of those whom she believed to be virtuous and enlightened, her house became the resort of many clergymen whose views were more or less opposed to those of Calvin. In their discussions young Priestley took considerable interest, and they may be supposed to have had considerable influence in leading him to a systematic examination of the grounds upon which he had rested his own belief. Before the age of nineteen he styles himself rather a believer in the doctrines of Arminius, though he adds, 'I had by no means rejected the doctrine of the Trinity or that of the Atonement.' Before leaving home, he expressed a desire to be admitted a communicant in the Calvinistic congregation which he had been in the habit of attending with his aunt; but the minister having elicited from his replies that he entertained doubts relative to the liability of the whole human race to 'the wrath of God and the pains of hell for ever,' on account of the sin of their first parent, his admission was refused.

On reaching the academy he found the professors and students about equally divided upon most questions which were deemed of much importance, such as liberty and necessity, the sleep of the soul, &c., and all the articles of theological orthodoxy and heresy, which thus became topics of animated and frequent discussion. The spirit of controversy thus excited was in some measure fostered by the plan for regulating their studies, drawn up by Dr. Doddridge, which specified certain works on both sides of every question which the students were required to peruse and form an abridgement of for their future use. Before the lapse of many months, he conceived himself called upon to renounce the greater number of the theological and metaphysical opinions which he had imbibed in early youth, and thus, he himself observes, 'I came to embrace what is generally called the heterodox side of every question: . . . . but notwithstanding the great freedom of our debates, the extreme of heresy among us was Arianism, and all of us, I believe, left the academy with a belief, more or less qualified, of the doctrine of the Atonement.' During his residence at the academy, he composed the first part of his 'Institutes of Natural and Revealed Religion,' published in 1772; the remaining three parts appeared in 1773-74.

On quitting the academy in 1755, he became minister to a small congregation at Needham-Market in Suffolk, at an average salary of 30*l.* per annum. To increase his income, he circulated proposals for teaching the classics, mathematics, &c., for half-a-guinea a quarter, and to board his pupils for 12 guineas a year. Finding these produced no effect, and that his congregation, on becoming acquainted with his opinions, were gradually forsaking him, which however may be in some measure ascribed to an increasing impediment in his speech, he quitted Needham in 1758, for a similar but temporary engagement at Nantwich in Cheshire. Here he was more successful as a schoolmaster, and by means of the strictest economy was able to purchase some philosophical apparatus, including an air-pump and electrical-machine, and also to keep out of debt, which, through life, he always made a point of doing. While at Needham, he informs us that a careful examination of the Old and New Testaments convinced him that 'the doctrine of the Atonement, even in its most qualified sense, had no countenance either from scripture or reason,' and induced him to compose his work entitled 'The Scripture Doctrine of Remission, which shows that the Death of Christ is no proper Sacrifice nor Satisfaction for Sin; but that Pardon is dispensed solely on account of a personal Repentance of the Sinner,' which was published in 1761, the year in which he removed from Nantwich, to succeed Mr. (afterwards Dr.) Aikin, as tutor in the languages and belles-lettres at Warrington academy. Here he married the daughter of Mr. Wilkinson, an ironmaster of Wales, a lady of great amiability and strength of mind, by whom he had several children. Here also he composed several works, among which are his lectures on 'The Theory of Language and Universal Grammar' (1762); on 'Oratory and Criticism' (1777); on 'History and General Policy' (1788); on 'The Laws and Constitution of England' (1772); an 'Essay on a Course of Liberal Education for Civil and Active Life' (1765); 'Chart of Biography' (1765); 'Chart of History' (1769), &c. A visit to the metropolis was the occasion of his introduction to Dr. Franklin, Dr. Price, and others. To the first of these he communicated his idea of writing a historical account of electrical discoveries, if provided with the requisite books. These Dr. Franklin undertook to procure, and before the end of the year in which Priestley submitted to him the plan of the work he sent him a copy of it in print, though five hours of every day had been occupied in public or private teaching, besides which he had kept up an active philosophical correspondence. The title of this work is 'The History and Present State of Electricity, with 'Original Experiments,' 1767 (third edition, 1775).[*] Shortly before (1766) its publication he was elected a member of the Royal Society, and about the same time the honorary title of Doctor of Laws was conferred upon him by the University of Edinburgh. The approbation bestowed on his 'History of Electricity' induced him some time after to compose his 'History and Present State of Discoveries relating to Vision, Light, and Colours,' 2 vols. 4to., which he intended should be succeeded by a similar account of the other branches of experimental science; but the sale of this work not answering his expectations, the design was abandoned, and, we believe, the work itself did not evince any very intimate knowledge of the subject.

A disagreement between the trustees and professors of the academy led to his relinquishing his appointment at Warrington in 1767. His next engagement was at Mill-Hill chapel, Leeds, where his theological inquiries were resumed, and several works of the kind composed, chiefly of a controversial character. The vicinity of his dwelling to a public brewery was the occasion of his attention becoming directed to pneumatic chemistry, the consideration of which he commenced in 1768, and subsequently prosecuted with great success. His first publication on this subject was a pamphlet on 'Impregnating Water with Fixed Air' (1772); the same year he communicated to the Royal Society his 'Observations on Different Kinds of Air,' to which the Copley medal was awarded in 1773.

'No one,' observes Dr. Thomson, 'ever entered upon the study of chemistry with more disadvantages than Dr. Priestley, and yet few have occupied a more dignified station in it, or contributed a greater number of new and important facts. The career which he selected was new, and he entered upon it free from those prejudices which warped the judgment and limited the views of those who had been regularly bred to the science. He possessed a sagacity capable of overcoming every obstacle, and a turn for observation which enabled him to profit by every phenomenon which presented itself to his view. His habits of regularity were such that everything was registered as soon as observed. He was perfectly sincere and unaffected, and the discovery of truth seems to have been, in every case, his real and undisguised object.' He discovered oxygen gas, nitrous gas, nitrous oxide gas, nitrous vapour, carbonic oxide gas, sulphurous oxide gas, fluoric acid gas, muriatic gas, and amoniacal gas. The first of these, which he named dephlogisticated air, he discovered in 1774, having obtained it by concentrating the sun's rays upon red precipitate of mercury. [OXYGEN.] He showed that the red colour of arterial blood resulted from its combination with the oxygen of the atmosphere; that the change produced in atmospheric air during the processes of combustion and putrefaction arose from a similar abstraction of oxygen; and recognised the property possessed by vegetables of restoring the constituent thus abstracted. Moreover the pneumatic apparatus now used by chemists was principally invented by him. 'But though,' observes Dr. Thomson, 'his chemical experiments were for the most part accurate, they did not exhibit that precise chemical knowledge which distinguished the experiments of some of his contemporaries. He never attempted to determine the constituents of his gases, nor their specific gravity, nor any other numerical result.' Of this he himself was doubtless aware; for in a letter written many years after (1795), he observes, 'As to chemical lectureship, I am now convinced I could not have acquitted myself in it to proper advantage.....Though I have made many discoveries in some branches of chemistry, I never gave much attention to the common routine of it, and know but little of the common processes.'

The theory promulgated by Lavoisier, though founded on the discoveries of Cavendish and Priestley, was never adopted by the latter, who continued to adhere to the phlogistic theory notwithstanding the many facts and arguments adduced against it.

While at Leeds, very advantageous proposals were made to him to accompany Captain Cook in his second voyage to the South Seas; but when about to prepare for his departure, it was intimated to him by Mr. (afterwards Sir Joseph) Banks, that objections to his religious principles had been successfully urged by some of the ecclesiastical members of the Board of Longitude.

In 1773, through the recommendation of Dr. Price, he received the appointment of librarian and literary companion to the Earl of Shelburne, with a salary of 250*l.* a year, a separate residence, and a certainty for life in the event of his lordship's death or their previous separation. In the second year of this engagement he accompanied his patron through France, Flanders, Holland, and Germany. At Paris his philosophical publications procured for him an easy introduction to several of the leading chemists and mathematicians, whom he describes as professed atheists; and by whom he was told that he was the only individual they had ever met with, and of whose understanding they had any opinion, who was a believer in Christianity. To combat their and similar prejudices, he wrote his 'Letters to a Philosophical Unbeliever, containing an examination of the principal objections to the doctrines of natural religion, and especially those contained in the writings of Mr. Hume' (1780); to which he afterwards added the 'State of the Evidence of Revealed Religion, with animadversions on the two last chapters of the first volume of Mr. Gibbon's History of the Decline and Fall of the Roman Empire' (1787). While resident with Lord Shelburne, who allowed him 40*l.* a year towards defraying the expenses of his chemical experiments, he printed the first four volumes of his 'Experiments and Observations on Air,' 1774-1779; a fifth appeared in 1780. He also wrote his 'Miscellaneous Observations on Education' (1778), and an 'Introductory Dissertation' to Hartley's 'Observations on Man.' In this dissertation, having expressed his doubts concerning the immateriality of the sentient principle in man, he was denounced in most of the newspapers and other periodicals as an unbeliever in revelation and an atheist. This led to the publication of his 'Disquisitions relating to Matter and Spirit' (1777), wherein his object is to show that man is wholly material, and that our only prospect of immortality is from the Christian doctrine of a Resurrection.' In the same year appeared his work on the 'Doctrine of Necessity.'

The cause of the separation between Priestley and Lord Shelburne (1780) has never transpired, and does not appear to have been known to Priestley himself. Some have attributed it to the odium to which the works last mentioned subjected their author, and to the invidious attacks which issued in almost all quarters from the press; but whatever may have been their true motives, the conduct of both appears to have been strictly honourable. Priestley retired with an annuity of 150*l.* a year, and in 1787 Lord Shelburne made overtures for renewing the original engagement, which however Priestley thought proper to decline.

Among the many points of church doctrine which, as we have seen, were successively repudiated by Dr. Priestley, it is remarkable that the doctrine of the Trinity should not have been hitherto included, at least not in the same unqualified manner. In a letter to Mr. Henderson, dated August, 1774, he has left a confession of his faith at that time. 'I believe,' he writes, 'the prophecies in our Bible were given by God; that the gospels are true; that the doctrine of original sin is absurd; that the spirit of God only assists our apprehension; that the foreknowledge of God, held by the Arminians, is equal to the decree of God held by the Calvinists; that they are both wrong; and the truth is, the pains of hell are purgatory. Many things I yet doubt of; among these are the Trinity and the mediation of Christ.'

On leaving Lord Shelburne, he became minister to the principal dissenting congregation at Birmingham, and a subscription was entered into by his friends for defraying his philosophical experiments and promoting his theological inquiries. His receipts from these sources must, by his own account, have been very considerable. Offers were also made to procure him a pension from government, but this he declined. In 1782, he published his 'History of the Corruptions of Christianity,' 2 vols. 8vo. A refutation of the arguments contained in this work was proposed for one of the Hague prize essays; and in 1785 the work itself was burnt by the common hangman in the city of Dort. It was succeeded by his 'History of Early Opinions concerning Jesus Christ,' 1786, 4 vols. 8vo.

A literary warfare now ensued between Priestley and Dr.

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[*] His 'Original Experiments,' though numerous and interesting, did not give rise to any discovery of importance, and the entire work is described by Dr. Thomson as 'carelessly written,' which may readily be attributed to the rapidity with which it was executed.

Horsley, by both of whom it was carried on with much warmth. In a letter to Dr. Price, dated Birmingham, January 27, 1791, he says, 'With respect to the church with which you have meddled but little, I have long since drawn the sword and thrown away the scabbard, and am very easy about the consequences.' But he did not confine himself to dealing with churchmen: his object was to obtain for the dissenters what he considered to be their rights, and in the pursuit of which he published about twenty volumes. He attacked certain positions relating to the dissenters in Blackstone's *Commentaries* with a vigour and acrimony which seem to have surprised his more courteous and feeble adversary.

His 'Familiar Letters to the Inhabitants of Birmingham,' from the ironical style in which they were written, exasperated even the populace, urged on by party malice and bigotry. His Reply to Burke's Reflections on the French Revolution, an event to which the lower orders of Birmingham were at that time unfavourably disposed, led to his being nominated a citizen of the French republic; and the occasion of a public dinner given by some of his friends, July 14, 1791, in celebration of the anniversary of the destruction of the Bastile, at which however Priestley himself was not present, afforded to an ignorant mob the opportunity of gratifying the malignity which they conceived they had grounds to entertain towards him. After demolishing the place where the dinner had been given, they broke into his house, destroyed his philosophical apparatus, a valuable collection of books, and a large number of manuscripts, the result of many years' labour, after which they made an unsuccessful attempt to burn the dwelling and what was left in it. [Birmingham.] An eye-witness of the 'riots' asserts that the high road, for full half a mile of the house, was strewed with books, and that on entering the library there was not a dozen volumes on the shelves, while the floor was covered several inches deep with the torn manuscripts. In the meantime, he and his family were forced to seek safety in flight. The first two nights he passed in a post-chaise, the two succeeding on horseback, but owing less to his own apprehensions of danger than to those of others. The sum awarded to him at the assizes as compensation for the damage is not stated, but he tells us that it fell short of his loss by 2000*l.* Individual generosity made amends. Among other instances of this kind, his brother-in-law made over to him the sum of 10,000*l.* invested in the French funds, besides an annuity of 200*l.* a year.

After this he removed to Hackney as the successor of his deceased friend Dr. Price; but finding his society shunned by many of his former philosophical associates, among whom were the members of the Royal Society, from whom he formally withdrew himself, and seeing no prospect of enjoying permanent tranquillity in England, he determined on quitting it. Accordingly, April 7, 1794, he embarked with his family for America, and took up his abode at Northumberland in Pennsylvania. A few days before his embarkation he was presented with a silver inkstand bearing the inscription, 'To Joseph Priestley, LL.D., &c., on his departure into exile, from a few members of the University of Cambridge, who regret that this expression of their esteem is occasioned by the ingratitude in their country.' He had contemplated no difficulty in forming a Unitarian congregation in America; but in this he was greatly disappointed. He found that the majority disregarded religion; and those who paid any attention to it were more afraid of his doctrines than desirous of hearing them. By the American government, the former democratic spirit of which had subsided, he was looked upon as a spy in the interest of France. 'The change,' he writes in a letter dated Sept. 6, 1798, 'that has taken place is indeed hardly credible, as I have done nothing to provoke resentment; but being a citizen of France, and a friend to that Revolution, is sufficient. I asked one of the more moderate of the party whether he thought if Dr. Price, the great friend of their own Revolution, was alive, he would now be allowed to come into this country. He said, he believed he would not.'

His wife died in 1796. His youngest son had died a few months previous. He himself, in 1801, became subject to constant indigestion and difficulty of swallowing any kind of solid food. This continued to increase till 1803, when, perceiving his end approaching, he told his physician that if he could prolong his life for six months, he should be satisfied, as in that time he hoped to complete the works upon which he was then engaged. These were his 'General History of the Christian Church from the Fall of the Western Empire to the Present Time,' 4 vols., 1802-3 (which had been preceded by his 'General History of the Christian Church to the Fall of the Western Empire,' 2 vols., 1790), and 'The Doctrines of Heathen Philosophy compared with those of Revelation' (posthumous). He died February 6, 1804, expressing the satisfaction he derived from the consciousness of having led a useful life and the confidence he felt in a future state in a happy immortality. On his death becoming known at Paris, his éloge was read by Cuvier before the National Institute. There is a statement in more than one work that Priestley's death was occasioned by poison, but it does not appear to be supported by any authority.

The auto-biography of Dr. Priestley, originally written, as he informs us, during one of his summer excursions, concludes with the date 'Northumberland, March 24, 1795.' It was published in America after his decease, with a continuation by his son Joseph Priestley, and observations on his writings by Thomas Cooper (president judge of the fourth district of Pennsylvania) and the Rev. William Christie. Priestley's Correspondence has been collected and incorporated with the above memoir by Mr. John Towill Rutt, forming the first two volumes of his collected edition of Priestley's 'Theological and Miscellaneous Works,' in 25 vols. 8vo., Hackney, 1817, &c. At pp. 537-544 of the second volume of this edition will be found, chronologically arranged, a complete list of Priestley's works; an imperfect list is given in Watt's 'Bibliotheca Britannica.'

(Thomson's *Annals of Philosophy*, 8vo., vol. i., 1813; Thomson's *History of the Royal Society*, 4to., 1812; Cuvier's 'Notice of the Life of Priestley,' in the *Biographie Universelle;* the articles 'Electricity' and 'Chemistry' in the *Encyclopædia Metropolitana*, by the Rev. Francis Lunn; Rutt's *Memoir and Correspondence of Priestley*, above mentioned, &c.)

PRIMATE. [Archbishop.]

PRIMA'TES, the name given by Linnæus to the first order of *Mammalia*, and thus characterised by him:—Dentes primores incisores; superiores iv., paralleli. Mammæ pectorales ii.

The order contains the following genera:—

Homo, of which Linnæus records two species, viz. *Homo sapiens* and its varieties (Man), and *Homo Troglodytes* (Homo sylvestris, Orang Outang, *Bout.*).

Simia, thirty-three species.

Lemur (including *Lemur volans*). [Pleuroptera.]

Vespertilio, six species. [Cheiroptera.]

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